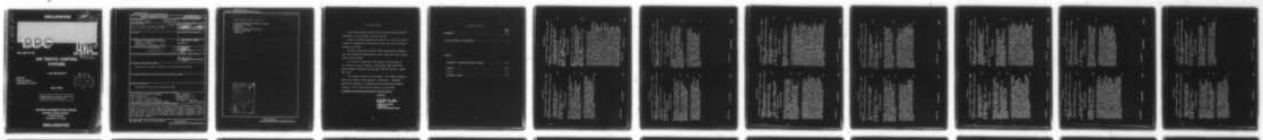
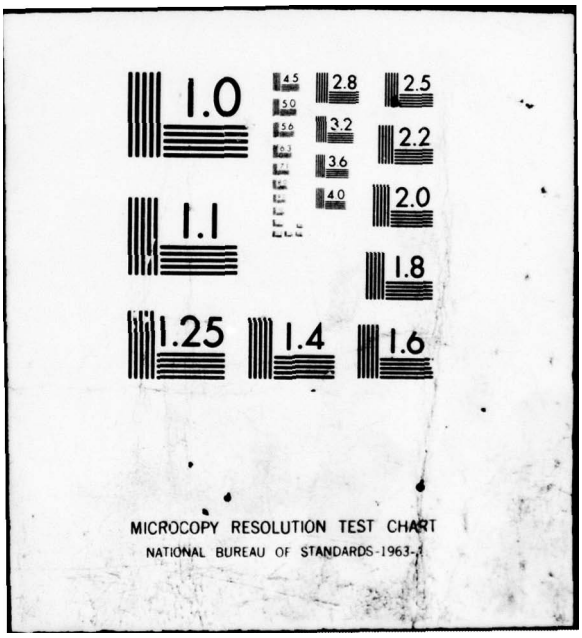
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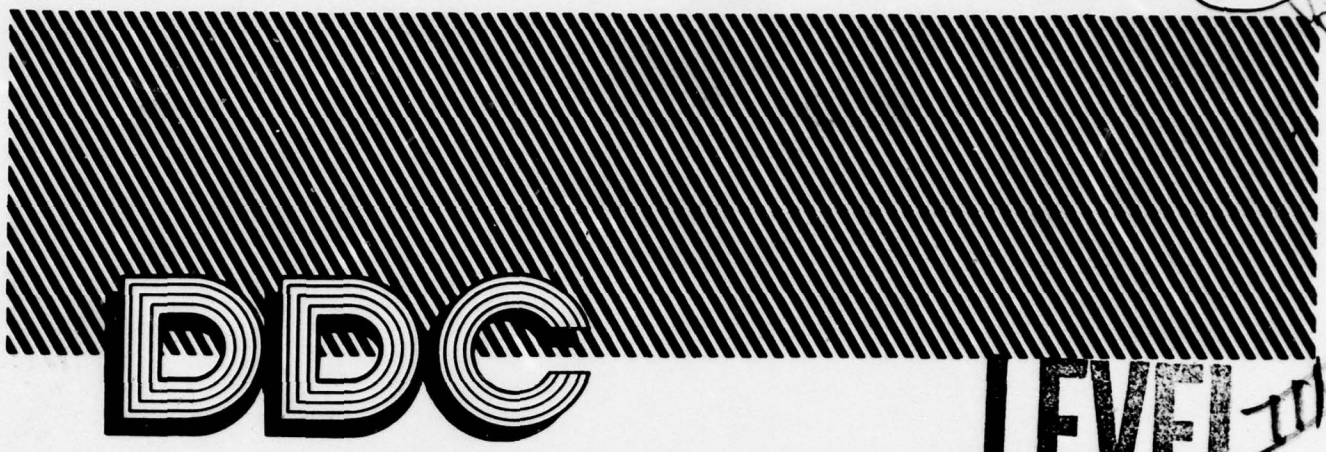
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*Bibliographies	Navigational Aids
Air Traffic Controllers	Landing Aids
Air Traffic Control Centers	Instrument Landings
Air Traffic Control Terminal Areas	(see reverse)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This bibliography contains unclassified and unlimited citations of reports on *Air Traffic Control Systems* that relate to air traffic control operators, approach and landing systems, instrument flight, radar approach control, human engineering, control centers, navigational aids, and control systems. Four computer-generated indexes are provided: Corporate Author-Monitoring Agency, Subject, Title and Personal Author.

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This bibliography contains 426 unclassified-unlimited citations on *Air Traffic Control Systems*.

These citations measure and assess air traffic control systems by subjective evaluation and by the use of various studies and tests.

Entries have been selected from references processed into the Defense Documentation Center data bank from August 1960 to March 1979.

This report supersedes DDC report bibliography on *Air Traffic Control Systems*, AD-679 220, DDC-TAS-68-52, dated October 1968 and AD-741 200, DDC-TAS-72-25-1, dated May 1972.

Individual entries are arranged in AD number sequence under the heading bibliographic references. Computer-generated indexes of Corporate Author-Monitoring Agency, Subject, Title and Personal Author are provided.

BY ORDER OF THE DIRECTOR, DEFENSE LOGISTICS AGENCY

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Hubert E. Sauter

HUBERT E. SAUTER
Administrator
Defense Documentation Center

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A067 996 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. SSILS Initial Evaluation Report. Pope AFB, North Carolina. 15 - 26 January 1979. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 79 110P Nix,Paul W. ;
REPT. NO. 79/66N-154

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aircraft landings, *Instrument landings, Glide slope, TACAN, Ultrahigh frequency, Air Force facilities, North Carolina (U)
IDENTIFIERS: AN/GRN-27, TRACALS(Traffic Control and Landing System), Pope Air Force Base, SSILS(Solid State Instrument Landing System), Localizers, AN/GRN-20B, AN/MPN-14, AN/TPX-42, AN/URN-15 (U)

This evaluation report presents data collected and analyzed to define the capabilities and limitations of the Pope AFB AN/GRN-27 and its associated power systems. The data presented in this report can be used as a valid guide to anticipated performance of the AN/GRN-27 until there is a significant change in ground equipment or in horizon screening. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A067 944 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Uplink ATCRBS Environment Measurements along the Boston-Washington Corridor. Volume 2. Interrogator Characteristics. (U)

DESCRIPTIVE NOTE: Project rept.,
FEB 79 88P Nagy,Ferenc , Jr;
REPT. NO. ATC-83-VOL-2
CONTRACT: F19628-78-C-0002, DOT-FA71-WAI-242
MONITOR: FAA/RD 78-33-VOL-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A058 654.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, Interrogation, Measurement, Inflight, Interrogators, Antenna radiation patterns, Interlacing, Flight paths, Altitude, Data acquisition, L band (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon System), Uplinks (U)

Airborne measurements of the Air Traffic Control Radar Beacon System (ATCRBS) 1030 MHz uplink environment due to ATC ground interrogators are described. The measurements were made using a special purpose airborne sensor-recorder during a flight from Boston to Washington (at 8500 feet) and back (at 17,500 feet) on 16 December 1977. Data were recorded at 24 locations between Boston and Washington. Volume 1 of this report summarized the measured distributions of pulse, interrogation, and suppression rates with received power. This volume presents specific characteristics of the sources of the interrogations observed from the air during this flight. These characteristics include the identities of 46 of the interrogators, the approximate locations of 22 unidentified interrogators, the interrogation repetition interval (PRI), scan period, and mode interlace of all interrogators, and the radiated P1, P2, and P3 levels in the form of antenna patterns for six selected interrogators. It was found that approximately 40% of the interrogators employ the standard AAC or 2ACA mode interlaces while 20% transmit no Mode C interrogations. (U)

AD-A067 925 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Aircraft Separation Assurance Technical Developments. (U)

DESCRIPTIVE NOTE: Technical paper.
FEB 79 30P
REPT. NO. FAA-EM-79-2(TP)

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Avionics, Aviation safety, Collision avoidance, Airport radar systems, Air control centers, Air traffic control terminal areas, Beacons, Air space, Civil aviation (U)
IDENTIFIERS: ASA(Aircraft Separation Assurance), CAS(Conflict Alert Service), ATARS(Automatic Traffic Advisory and Resolution Service), BCAS(Beacon Collision Avoidance System), DABS(Discrete Address Beacon System) (U)

It is the purpose of this paper to provide background on the portion of the FAA plan that relates to the technical systems needed for aircraft separation assurance and future avionics requirements. This discussion will deal with the technology developments and the rationale for the actions taken and proposed. (Author) (U)

AD-A067 910 1/2 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF MANAGEMENT SYSTEMS

FAA Air Traffic Activity, Fiscal Year 1978, (U)

SEP 78 239P Wilson,Patricia ;

UNCLASSIFIED REPORT

Availability: Superintendent of Documents, Government Printing Office, Washington, DC 20402 HC $4.50.
DESCRIPTORS: *Air traffic, *Airport control towers, Aviation safety, Airports, Tables(Data), Air transportation, Statistics, Instrument landings, Air traffic control systems, Statistical analysis, Airport radar systems (U)
IDENTIFIERS: *Federal Aviation Administration (U)

This report furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service Stations (FSSs), Combined Station Towers (CS/Ts), International Flight Service Stations (IFSSs), and Approach Control Facilities. (Author) (U)

AD-A067 905 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Report of the FAA Task Force on Aircraft Separation Assurance. Volume I. Executive Summary, (U)

DEC 78 33P Blake,Neal A. ;Koenke, Edmund J. ;Page,Leland F. ;Pozesky,Martin T. ;
REPT. NO. FAA-EM-78-19-VOL-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Air traffic control systems, Air space, Allocations, Errors, Aircraft, Separation, Aviation safety, Warning systems, Integrated systems, Automation, Beacons, Aviation accidents (U)
IDENTIFIERS: ASA(Aircraft Separation Assurance), Midair collisions, BCAS.Beacon Collision Avoidance Systems), DABS(Discrete Address Beacon System), ATARS(Automatic Traffic Advisory and Resolution Service), CAS(Conflict Alert Service) (U)

A task force has developed FAA Engineering and Development consensus on the integrated aircraft separation assurance system for the National Airspace System. This report details a study of system errors, mid-airs, and near mid-airs to define the problem. The system element requirements are defined to provide two levels of backup to the ATC system: a separation violation warning and a last-ditch collision advisory and resolution function. The current FAA ASA developement programs are discussed and the changes are detailed which are required to transition to an integrated ASA system. This report consists of three volumes. Volume I is the Executive Summary with an overview of thework performed by the Task Force. (U)

AD-A067 826 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

A Comparison of the Job Attitudes and Interest Patterns of Air Traffic and Airway Facility Personnel. (U)

MAR 79. 13P Smith,Roger C. ;
REPT. NO. FAA-AM-79-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Attitudes(Psychology), *Job satisfaction, *Air traffic controllers, Patterns, Measurement, Questionnaires, Motivation, Ratings (U)

Air traffic control specialists (ATCSs) and airway facility technicians (AFTs) were compared on measures of job attitudes and interests. A total of 792 ATCSs and 2,366 AFTs completed the Strong Vocational Interest Blank (SVIB) and questionnaires concerning job satisfaction and job attitudes. Both groups indicated high overall job satisfaction and general agreement about areas of job satisfaction and dissatisfaction. However, ATCSs reported more satisfaction than AFTs from various aspects of the work itself and from salary, while AFTs were more satisfied with responsibility, working conditions, and Civil Service retirement. The AFTs were more favorable to management than ATCSs. On the SVIB, ATCSs had higher scores than AFTs on scales concerned with interpersonally oriented vocations (e.g., social service, sales) and lower scores on technical-scientific occupational scales. The findings suggest that these two employee groups have much in common with respect to their attitudes toward work while at the same time having certain discriminable characteristics that have implications for both personnel and motivational programs. (Author) (U)

AD-A067 764 17/7 1/5 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

SSILS Initial Evaluation Report Homestead AFB, Florida. 27 November - 10 December 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 79 100P Clark,Allen D. ;
REPT. NO. 78/65N-149

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aircraft landings, *Instrument landings, Solid state electronics, Air Force facilities, Airport control towers, Landing fields, Runways, Florida (U)
IDENTIFIERS: TRACALS(Traffic Control and Landing System), Homestead air force base, AN/GRN-27, SSILS(Solid State Instrument Landing System), AN/FPN-47, AN/TPX-42, AN/FPN-16, AN/GRN-27, AN/GRN-20A (U)

This report presents the results of the 27 November - 10 December 1978 TRACALS evaluation of the Homestead AFB AN/GRN-27, SSILS and associated power systems. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author) (U)

AD-A067 162 17/2.1 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Initial Evaluation Report, Torrejon AB, Spain, 6 - 20 November 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 79 81P Mathews,Allen C. ;
REPT. NO. 78/66C-146

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, *Landing aids, Test and evaluation, Ground stations, Air traffic control terminal areas, Rivets, Switches, Air to surface, Surface to air, Power supplies, Air Force facilities, Landing fields, Mission profiles, Logistics support (U)

A Traffic Control and Landing System (TRACALS) Communications Initial Evaluation was performed at Torrejon AB, Spain (1989 Comm Gp) from 6-20 November 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the ground controlled approach and control tower. This report can be used as a guide for anticipated performance of the air traffic control communications systems at Torrejon AB until there is a deletion, addition, relocation of equipment, or a change in the horizontal profile which would affect the system. (Author) (U)

AD-A066 734 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

Tracals Evaluation Report. SSILS Initial Evaluation Report, Yokota AB, Japan, 22 October - 30 November 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 79 128P Leister,Harvey J. ;
REPT. NO. 78/66N-148

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Air traffic control systems, *Radio navigation, Landing fields, Glide slope, Test and evaluation Aircraft landings, Flight testing, Runways, Airports, Japan (U)
IDENTIFIERS: Yokota Air Base, AN/GRN-27, Horizon screening, TRACALS(Traffic Control and Landing System), SSILS(Solid State Instrument Landing System), Air bases, Localizers, Coursewidth, Solid state equipment (U)

This evaluation report presents data collected and analyzed to define the capabilities and limitations of the Yokota AB Solid State Instrument Landing System (AN/GRN-27) and its associated power systems. The ground evaluation phase was conducted from 22 October - 10 November 1978 and the flight evaluation was conducted from 11 - 30 November 1978. The results indicate that the facilities are fully capable of providing satisfactory Category II service. The data presented in this report can be used as a valid guide to anticipated performance of the SSILS until there is a significant change in equipment or horizon screening. (Author) (U)

AD-A066 132 5/10 5/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

The Development of the ATC Selection Battery: A New Procedure to Make Maximum Use of Available Information When Correcting Correlations for Restriction in Range due to Selection, (U)

SEP 78 47P Boone,James O. ;Lewis,Mary A. ;
REPT. NO. FAA-AM-78-36

UNCLASSIFIED REPORT

DESCRIPTORS: *Psychological tests, *Personnel selection, *Monte Carlo method, *Air traffic controllers, Correlation techniques, Range(Distance), Editing, Jobs, Performance(Human), Statistical analysis (U)
IDENTIFIERS: Battery tests, Success criterion, LPN-FAA-AM-C-78-PSY-70 (U)

A five-test selection battery was given to select Air Traffic Controllers. Data were collected on two new tests being considered for incorporation into the battery. To determine the utility of the old and new tests, it is necessary to correlate the tests with a criterion of job success. However, since criterion information is available only on persons already selected for air traffic control work, the correlation is restricted to this upper range of persons, and is, thereby, spuriously low for prediction purposes. To properly evaluate the utility of the tests, the correlation must be corrected for this restriction in range. This paper describes a new procedure to more accurately correct correlations for restriction in range. By Monte Carlo methods the new procedure is compared with Gulliksen and Thorndike's procedures and is shown to be more accurate. (U)

AD-A065 767 5/10 6/16
FEDERAL AVIATION ADMINISTRATION OKLAHOMA CITY OKLA CIVIL AEROMEDICAL INST

Stress in Air Traffic Controllers: A Restudy of 32 Controllers 5 to 9 Years Later. (U)

OCT 78 11P Melton,C. E. ;McKenzie, J. M. ;Wicks,S. M. ;Saldivar,J. T. ;
MONITOR: FAA-AM 78-40

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, Stress(Physiology), Excretion, Steroids, Epinephrine, Work (U)
IDENTIFIERS: LPN-FAA-AM-C-77-PHY-102 (U)

Thirty-two subjects who had participated in air traffic controller stress studies 5-9 years earlier were restudied with regard to urinary excretion of 17-ketogenic steroids, epinephrine, and norepinephrine. All subjects showed decreases in excretion of 17-ketogenic steroids. Eight of the subjects had taken noncontroller jobs; these subjects showed work-related increases in epinephrine excretion whereas the 24 controllers who remained active in controlling aircraft showed work-related decreases in epinephrine excretion. There were no significant findings related to norepinephrine excretion. It is concluded that the active controller group shows evidence of reduced chronic stress. Various interpretations of this finding include less stress at their new facilities, greater experience in their jobs, improvements in the entire traffic control system, and the effects of normal aging. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A065 461 1/5 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

SRDS Technical Program Document. Fiscal Year 1979. Research and Development Approved Projects. (U)

JAN 79 231P
REPT. NO. FAA/RD-79-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Civil aviation, *Air traffic control systems, *Navigation aids, Automation, Navigation, Weather, Landing aids, Aircraft landings, Aviation safety, Airports, Commercial aviation, Radar, Beacons, Communication and radio systems, Reports (U)

This document contains research and technology resumes which reflect Systems Research and Development Service, Federal Aviation Administration, approved projects. These resumes highlight the requirement, technical objective, approach milestones scheduled for accomplishment, and end item products. Engineering and development topics include: Radar, Beacon, Navigation, Airborne separation assurance, Communications, Approach and landing systems, ATC systems command center automation, Enroute control, Flight service stations, Terminal/Tower control, Weather, and Aircraft safety. (U)

AD-A065 071 1/2 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. SSILS Station Evaluation Report. RAF Mildenhall, United Kingdom, 17 October - 10 November 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 79 129P Nix,Paul W. ;
REPT. NO. 78/66N-143

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Air traffic control systems, Great Britain, Air Force facilities, Alignment, Aircraft landings, Clearances, Glide slope, Radio telemetry, Theodolites, Approach, Solid state electronics, Beacons, Reliability(Electronics), Atmospheric refraction (U)
IDENTIFIERS: AN/GRN-27(V), SSILS(Solid State Instrument Landing System), TRACALS(Traffic Control Approach and Landing System), RTT(Radio Telemetric Theodolites) (U)

This report presents the results of the 17 October - 10 November 1978 TRACALS station evaluation of the RAF Mildenhall, UK AN/GRN-27 (V) Solid State Instrument Landing System (SSILS). The ground and airborne data presented herein can be used as a valid guide to anticipated performance of the SSILS until there is a significant change in ground equipment or in horizon screening. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A065 045 17/9 17/7
ARMY MISSILE RESEARCH AND DEVELOPMENT COMMAND REDSTONE ARSENAL AL TECHNOLOGY LAB

Radar Track Data Correlation or Reachable Sets Revisited: The Reachable State. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 78 31P Dickson,Richard E. ;
REPT. NO. DRDMI-T-78-61

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar tracking, *Flight paths, *Air traffic control systems, Correlation techniques, Flight Maneuvers, Position finding, Mathematical prediction, Set theory (U)
IDENTIFIERS: Reachable sets analysis (U)

Given an aircraft's position and velocity at time t sub 0 and the limits on the rate at which the aircraft executes horizontal turns, what is the set of all possible position at time t, given the change in heading at time t and that the speed is unchanged. (Author) (U)

AD-A064 945 9/5 13/12 17/7 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of Cathode-Ray Tube Protection and Antireflective Surfaces for the Plan View Display. (U)

DESCRIPTIVE NOTE: Final rept. Oct 73-Jun 78,
JAN 79 70P Mitchell,Robert H. ;
Aschenbach,John W. ;
REPT. NO. FAA-NA-78-37
MONITOR: FAA-RD 78-130

UNCLASSIFIED REPORT

DESCRIPTORS: *Cathode ray tubes, *Cathode ray tube screens, *Display systems, *Air traffic control systems, *Safety, Implosions, Protection, Antireflection coatings, Laminates, Lightning, Radar images, Plan position indicators (U)
IDENTIFIERS: LPN-FAA-122-111-510 (U)

The purpose of this report is to describe the evaluation of implosion protection systems and antireflective surfaces for cathode-ray tube (CRT) used in plan view displays (PVD's) for air traffic control (ATC). An implosion forcing device was fabricated utilizing coolant spray and a carbide-tipped punch to impact the critical CRT shoulder area to induce implosions. Results showed that none of the six CRT's tested utilizing the Kimcode -type implosion system could be imploded violently. Ten other CRT's were evaluated for antireflectivity and optimum resolution. Various antireflective surfaces were tried. Subjective analysis indicated that an etched surface was sufficient to reduce reflections for ATC use. The combination of etch and High Efficiency Antireflective (HEA) coating was judged most antireflective, but fingerprints on the HEA-coated surface could be seen. (Author) (U)

AD-A064 909 17/7 1/5 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Engineering and Development Program Plan. Terminal/Tower Control. (U)

DESCRIPTIVE NOTE: Rept. for 1978-1982.
NOV 78 94P
REPT. NO. FAA-ED-14-2A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. FAA-ED-14-2 dated Apr 73, AD-772 746. See also AD-A051 621.
DESCRIPTORS: *Airport control towers, *Air traffic control systems, *Airport radar systems, Radar beacons, Systems engineering, Planning, Display systems, Automation, Air traffic control terminal areas, Data processing, Data links (U)
IDENTIFIERS: ARTS(Automated Radar Terminal System) (U)

This document sets forth the engineering and development plan for FAA E/D Program 14: TERMINAL/TOWER CONTROL. The plan covers the relationship of Program 14 to the overall E/D effort, defines the purpose, scope and direction of the program, and describes the major technical elements of the program. The plan is intended to provide guidance to personnel charged with carrying out development activities under Program 14 and to provide a tool for the continuing management and control of these activities. The plan will also serve as a basis for estimating the funds required and for seeking approval of budgets. (Author) (U)

AD-A064 826 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Air Traffic Control in the Year 2000. (U)

DESCRIPTIVE NOTE: Final rept. for period ending 11 Oct 77,
NOV 77 20P Del Balzo,Joseph M. ;
REPT. NO. FAA-NA-78-4

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aviation safety, *Reports, Meteorological data, Automation, Display systems, Aircraft landings, Air traffic, State of the art, Technology forecasting, Safety equipment (U)
IDENTIFIERS: LPN-FAA-975-001-01A (U)

This document was prepared at the invitation of the Air Traffic Control Association (ATCA) for presentation at the ATCA 22nd Annual Meeting and Technical Program on 'Tomorrow's NAS Concepts and Requirements In Light of the Realities of Today,' Las Vegas, Nevada, October 10-13, 1977. (Author) (U)

AD-A064 444 1/5 5/3
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Terminal Area Delay and Fuel Consumption Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Aug 77-Aug 78,
JAN 79 123P Halverson,Arthur G. ;Jolitz, Gordon ;
REPT. NO. FAA-NA-78-40
MONITOR: FAA-EM 78-20

UNCLASSIFIED REPORT

DESCRIPTORS: *Terminal flight facilities, *Delay, *Fuel consumption, Air traffic control terminal areas, Air traffic control systems, Estimates, Data acquisition, Radar equipment, Cost analysis, Data bases, Management planning and control (U)

The purpose of this project was to develop estimates of excess mileage flown in the terminal area, to estimate excess fuel burn due to air traffic control (ATC) delay maneuvers, and to develop a method to analyze the effect of future ATC concepts to reduce delay. The National Aviation Facilities Experimental Center (NAFEC) derived first-order estimates of delay and excess fuel consumption through analysis of track data recorded online by the Advanced Radar Terminal System (ARTS III). The data base for this initial effort was collected during the 1974-1975 time period from the Chicago, Miami, Los Angeles, and Washington terminal areas in conjunction with the ATC/Airborne CAS Compatibility Analysis project. Results show that the use of ARTS track data to derive estimates of delay and excess fuel consumption proved to be an effective approach, provided appropriate processing and manual review of the data are effected. (U)

AD-A064 329 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

Communication Station Evaluation Report Myrtle Beach AFB, South Carolina, 18-30 October 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 69P Mathews,Allen C. ;
REPT. NO. 78/66C-136

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar landing control, *Air traffic control systems, Communication and radio systems, Instrument landings, Communication equipment, Tacan, Search radar, Radar beacons (U)
IDENTIFIERS: Tracals project, Myrtle Beach Air Force Base, AN/GPN-12, AN/TPX-42, AN/FPN-16 (U)

A Traffic Control and Landing System(TRACALS) Communications Evaluation was performed at Myrtle Beach AFB, South Carolina from 18-30 October 1978 to define the capabilities and limitations of the ATC communications equipment servicing the radar approach control and control tower. This report can be used as a guide for anticipated performance of the ATC communications at Myrtle Beach AFB until there is a deletion, addition, relocation of equipment, or a change in the horizon profile which would affect the system. (Author) (U)

AD-A063 815 17/7 1/2 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Ssil Station Evaluation Report, Keesler AFB, Mississippi, 5-15 September 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 119P Clark,Allen D. ;
REPT. NO. 78/66N-138

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Air traffic control systems, *Radio navigation, Solid state electronics, Test and evaluation, Ground support equipment, Glide slope, Air force facilities, Landing fields, Mississippi (U)
IDENTIFIERS: Keesler air force base, SSILS(Solid State Instrument Landing Systems), AN/GRN-27, *Instrument landing systems, TRACALS(Traffic Control and Landing Systems) (U)

This evaluation report presents data collected and analyzed to define the capabilities and limitations of the Keesler AFB AN/GRN-27 and its associated power systems. The data presented in this report can be used as a valid guide to anticipated performance of the AN/GRN-27 until there is a significant change in ground equipment or in horizon screening. (Author) (U)

AD-A063 813 17/7 17/9 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Radar Station Evaluation Report, Mather AFB, California, 20-30 September 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 94P Pinney,Earl T. , Jr.;
REPT. NO. 78/66R-141

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Search radar, *Ground controlled approach radar, *Radar beacons, *Air traffic control systems, Test and evaluation, California (U)
IDENTIFIERS: Mather air force base, TRACALS(Traffic Control and Landing System), AN/GPN-12, AN/TPX-42, AN/FPN-61, ASR(Airport Surveillance Radar), PAR(Precision Approach Radar), ATCRBS(Air Traffic Control Radar Beacon System) (U)

This radar station evaluation report presents data collected from 20-30 Sep 1978 to define the capabilities and limitations of the ground controlled approach(GCA) facility at Mather AFB, California. This report includes descriptions of the useable ASR, PAR, and ATCRBS coverage and tracking capabilities, analysis of all flight equipment performance data, and the performance predictions for each system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A063 810 1/5 9/2 17/7 17/9
IIT RESEARCH INST ANNAPOLIS MD

Federal Aviation Administration Flight Service Station. Emergency Services Program. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 78 36P Atwell,Franklin ;
CONTRACT: F19628-78-C-0006, DOT-FA70-WAI-175
PROJ: 649E
MONITOR: FAA-RD,ECAC 78-140,PR-78-043

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Information retrieval, Data bases, Computer programs, Plotters, Line of sight, Air traffic control systems, Surveillance, Direction finding stations, United States, Area coverage, Flight paths, Routing, Terrain, Altitude, Emergencies (U)
IDENTIFIERS: Surveillance radar, PE65704F (U)

Program, formats and outputs are described that were developed and produced by ECAC for the Federal Aviation Administration. These programs can be used to describe the existing LOS coverage area of FAA direction- finding stations, airport surveillance radars, and air route surveillance radars, in the conterminous United States. (Author) (U)

AD-A063 805 17/7 1./7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report, Radar Station Evaluation Report, Minot AFB, North Dakota, 16-28 October 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 74P Chaumont,Roderick C. ;
REPT. NO. 78/66R-142

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Search radar, *Air traffic control systems, *Radar beacons, Test and evaluation, Air Force facilities, Landing fields, North Dakota (U)
IDENTIFIERS: Minot Air Force Base, AN/GPN-12, AN/TPX-42, AN/GPA-133, ASR(Airport Surveillance Radar), ATCRBS(Air Traffic Control Radar Beacon System), BRITE (Bright Radar Indicator Tower Equipment), TRACALS(Traffic Control and Landing System) (U)

This radar station evaluation report presents data collected from 16-28 October 1978 to define the capabilities and limitations of the RAPCON facility at Minot AFB, North Dakota. This report includes descriptions of the useable ASR, ATCRBS, and BRITE II coverage and tracking capabilities, analysis of all flight equipment performance data, and the performance predictions for each system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment; or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A063 766 17/7 17/9 20/14
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Airborne Measurements of ATCRBS Fruit. (U)

DESCRIPTIVE NOTE: Project rept.,
OCT 78 31P Harman,William H. ;
REPT. NO. ATC-84
CONTRACT: F19628-78-C-0002, DOT-FA77-WAI-727
MONITOR: FAA-RD 77-149

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Transponders, Transmitter receivers, Aircraft antennas, Mathematical prediction, Interrogator transmitters, L Band, Radiofrequency interference, Altitude, Airborne (U)
IDENTIFIERS: Fruit rates, Asynchronous replies, Replies, Thresholds(Electronics), LPN-FAA-052-241-04 (U)

Airborne measurements of ATCRBS fruit (asynchronous replies from ATCRBS transponders) are described. These measurements were undertaken to provide a more firm basis for assessing the interference impact of ATCRBS fruit on airborne 1090 MHz receivers (as in BCAS). Fruit rate measurements were performed with an instrumented aircraft flying along the East Coast from Boston to Washington and in the Los Angeles Basin. The results of these measurements are reported here, with fruit rates given as a function of altitude, geographical location, and receiver threshold, for receptions on both top-mounted and bottom-mounted aircraft antenna. The highest observed fruit rates, approximately 10,000 replies/sec, occurred in the LA Basin. To complement the measurements, a first-order fruit prediction model is defined. Predictions of this model are compared with the measurements, generally showing favorable agreement in absolute fruit rate, in power distribution, and in the functional dependence on traffic density. (Author) (U)

AD-A063 735 1/2 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, Mather AFB, California. 20-28 September 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 62P Pinney,Earl T. , Jr;
REPT. NO. 78/66C-140

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radio Equipment, *Ground stations, *Communications central, Airport control towers, Test and evaluation, Multipath transmission, Line of sight, Area coverage, California (U)
IDENTIFIERS: Mather Air Force Base, TRACALS(Traffic Control and Landing System), GCA(Ground Controlled Approach), Rivet switch project, ATIS(Automatic Terminal Information System), MEA(Minimum Enroute Altitude) (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at Mather AFB, California (2034 Comm Sq) from 20-28 September 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the ground controlled approach (GCA) and control tower. This report can be used as a guide for anticipated performance of the air traffic control communications at Mather AFB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would affect the system. (Author) (U)

AD-A063 726 17/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ATARS/ATC Simulation Tests with Site-Adaptation Logic. (U)

DESCRIPTIVE NOTE: Final rept. Dec 77-Apr 78,
JAN 79 38P Windle,James R. ;Morfitt, Gary ;Devine,P. J. ;Rossiter,Sidney B. ; Fillius,Arthur W. ;
REPT. NO. FAA-NA-78-42
MONITOR: FAA/RD 78/138

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Collision avoidance, Air traffic controllers, False alarms, Aviation Safety, Flight paths, Control simulators, Automation, Visual flight rules, Command and control systems, Warning systems (U)
IDENTIFIERS: Instrument flight rules, FPWI(Flashing Proximity Warning Indicators), ATARS(Automatic Traffic Advisory and Resolution Service), LPN-FAA-034-242-320 (U)

The objective of this project was to assess the effectiveness of proposed Automatic Traffic Advisory and Resolution Service (ATARS) site-adapted logic designed to reduce unnecessary alarms in a terminal air traffic control environment. The tests were conducted at the National Aviation Facilities Experimental Center (NAFEC) at Atlantic City, New Jersey, using the Air Traffic Control Simulation Facility (ATCSF). Test results indicated tha the site-adapted logic reduced the numerous unnecessary alarms experienced in previous simulation tests. In fact, no ATARS alarms were generated in any of the tests involving instrument flight rules (IFR) separation procedures. Under IFR and/visual flight rules (VFR) separation rules, a total of seven ATARS controller alerts was issued over four 1-hour data runs. One aircraft received a positive vertical command, and four received negative horizontal commands; the remaining aircraft received flashing proximity warning indicators (FPWI's). (U)

AD-A063 725 1/5
NAVAL AIR ENGINEERING CENTER LAKEHURST N J

Approach Light Aiming Criteria. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 67P Douglas,Charles A. ;
CONTRACT: DOT-FA77-WAI-786
MONITOR: FAA-RD 78-137

UNCLASSIFIED REPORT

DESCRIPTORS: *Approach lights, *Air traffic control terminal areas, Glide slope, Aiming, Visual aids, Flight paths, Elevation, Aircraft landings, Flight envelope, Beams(Radiation) (U)

A method of determining the elevation setting angles for approach lights based upon fundamental principles has been developed. This method considers the effects of the applicable decision height, the required visual range, the glide slope angle, the distance of the light from the threshold, and the vertical beam spread of the light. This method, defined as the visual segment method, has been compared with other methods and found to be preferable. Elevation-setting-angles have been computed for the lights of the MALSR and ALSF-2 approach-light systems when lamped with the types of lamps presently in service. The suitability of the intensity distribution characteristics of the lights currently used in U.S. approach-light systems has been analyzed and possible changes noted. (Author) (U)

AD-A063 709 5/9 6/16
BOSTON UNIV MASS SCHOOL OF MEDICINE

Air Traffic Controller Health Change Study, (U)

DEC 78 819P Rose,Robert M. ;Jenkins,C. David ;Hurst,Michael W. ;
CONTRACT: DOT-FA73WA-3211
MONITOR: FAA-AM 78-39

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Texas Univ. Medical Branch at Galveston. Dept. of Psychiatry and Behavioral Sciences.
DESCRIPTORS: *Air traffic controllers, *Health, Illness, Health surveys, Hypertension, Job analysis, Stress(Physiology), Tables(Data) (U)

The main goal of the Study was to determine the nature and extent of health changes in the Air Traffic Controllers and by what characteristics these health changes might be predicted. (Author) (U)

AD-A063 662 17/9 1/5
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09057

TRACALS Evaluation Report. Radar Station Evaluation Report, RAF Alconbury, England 22 - 28 June 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 78 89P Minsterl,James R. ;
REPT. NO. 78/68R-32

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control systems, *Ground controlled approach radar, Great Britain, Reliability, Test and evaluation (U)
IDENTIFIERS: AN/TPX-42A (U)

This Traffic Control and Landing System (TRACALS) radar station evaluation report presents data collected from 22 - 28 June 1978, to define the capabilities and limitations of the ground controlled approach (GCA) facility at RAF Alconbury, England. The GCA is comprised of an AN/MPN-13 airport surveillance/precision approach radar, AN/TPX-42A(V)1 air traffic control radar beacon system, and associated power systems. This report includes descriptions of the useable ASR coverage and tracking capabilities, the PAR coverage and capabilities, the analysis of flight and equipment performance data for the ASR, ATCRBS, and PAR systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A063 649 1/2 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Vortex Advisory System Safety Analysis. Volume I. Analytical Model. (U)

DESCRIPTIVE NOTE: Final rept. Oct 77-Aug 78,
SEP 78 154P Hallock,J. N. ;
REPT. NO. TSC-FAA-78-15.1
MONITOR: FAA/RD 78-68.1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Vortices, Aircraft landings, Runways, Approach, Aviation safety, Aviation accidents, Glide slope, Flight paths (U)

An analysis was conducted to examine the safety of decreasing landing aircraft separations to three nautical miles between the outer marker and the runway threshold. Such reduced separations would only be used when the Vortex Advisory System indicated that wake vortices would not pose a threat to a following aircraft. Based on state-of-the-art models of vortex and aircraft behavior, the analysis indicates that such reduced interarrival separations may be used safely by Large and Heavy aircraft following Heavies. When the analysis is expanded to include an as-yet unproven cross-winds aloft model, the results indicate that reduced separations may be used by all aircraft regardless of leader/follower aircraft type. Volume I addresses the safety problem from an analytic point of view; Volume II (to be published at a later date) will examine the problem using data collected specifically to verify the analytical model; and Volume III (to be published at a later date) will contain a detailed sensitivity analysis of the model predictions and a critique of the assumptions. (Author) (U)

AD-A062 654 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

Radar Station Evaluation Report George AFB, California 92392, 21 August-1 September 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 78 67P Chaumont,Roderick C. ;
REPT. NO. 78/66R-139

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, Performance(Engineering), Air traffic control systems, Data acquisition, Predictions, Test and evaluation, Military facilities, Airports, Radar tracking, Surveillance, Beacon lights, Operational effectiveness (U)
IDENTIFIERS: ASR(Airport Surveillance Radar), ATCRBS(Air Traffic Control Beacon System), AN/GPN-12, AN/TPX-42 (U)

This radar station evaluation report presents data collected from 21 Aug-1 Sep 1978 to define the capabilities and limitations of the ground control approach (GCA) facility at George AFB, California. This report includes descriptions of the useable ASR and ATCRBS coverage and tracking capabilities, analysis of all flight and equipment performance data, and the performance predictions for each system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A062 053 17/7 9/2
SYSTEMS CONTROL INC PALO ALTO CALIF

RNAV Route Design-Terminal Area Design Procedures and Transition Area Design Guidelines. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 78 221P McConkey,Edwin D. ;
Halverson,A. George ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA/RD 78/61

UNCLASSIFIED REPORT

Availability: Document partially illegible.
DESCRIPTORS: *Navigation computers, *Air traffic control systems, Routing, Airports, Computer programming, Communication terminals, Avionics, Flow charting, Subroutines (U)

This report presents techniques which can be used to produce terminal and transition area route structures that are designed for use by aircraft equipped with area navigation (RNAV) computers. The route design processes were developed during several years of investigation into RNAV route structures for terminal and enroute airspace. The design techniques provide for the consideration of user and Air Traffic Control (ATC) requirements. Among the user considerations are minimization of the number of waypoints and the reduction of aircraft time and fuel penalties by utilizing the RNAV routes. The ATC considerations include procedural separation of arriving and departing aircraft, organization of the terminal area according to traffic flow, and provision for sufficient maneuvering airpsace to permit efficient traffic separation procedures. (U)

AD-A061 963 1/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Computer Application in Flight Control for Identifying and Eliminating Possible Conflicts, (U)

NOV 77 7P Gledec,Mladen ;
REPT. NO. FTD-ID(RS)T-1719-77

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Tehnika (Yugoslavia) v31 n7-8 p1226-1227 1976, by Slobodan Jaukovic.
DESCRIPTORS: *Air traffic control systems, Computer applications, Air traffic controllers, Pilots, Conflict, Yugoslavia, Translations (U)

Computer Application in Flight Control for Identifying and Eliminating Possible Conflicts-- Translation.

AD-A061 949 17/7 1/2 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

FAA BCAS Concept. Volume III B. Appendices F - M, (U)

APR 78 323P Koenke,E. J. ;
REPT. NO. FAA-EM-78-5-III-B

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3A, Appendices A-E, AD-A061 948 and Volume 1, A056 930.
DESCRIPTORS: *Collision avoidance, *Air traffic control systems, *Discrete address beacon systems, Radar antennas, Directional antennas, Position finding, Algorithms, Computerized simulation (U)
IDENTIFIERS: BCAS(Beacon Collision Avoidance System), ATCRBS(Air Traffic Control Radar Beacon System) (U)

For complete abstract see AD-A061 948. Appendices in this volume include: Passive Position Determination Procedure, Single Site ATCRBS/RBX; SSR North Directional Errors and Their Influence on BCAS Performance; The BCAS Antenna; BCAS Problems Solved via the Directional Antenna; Supplementary Detail on Reply Processor; BCAS Collision Avoidance Algorithms; ATARS-BCAS Interface Algorithms; and Simulations of BCAS Performance vs Measurement Error. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A061 948 17/7 1/2 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

FAA BCAS Concept. Volume IIIA. Appendices A-E, (U)

APR 78 458P Koenke,E. J. ;
REPT. NO. FAA-EM-78-5-III-A

UNCLASSIFIED REPORT

Availability: Document partially illegible.
SUPPLEMENTARY NOTE: See also Volume 3B, Appendices F-M, AD-A061 949. Includes an envelope containing a chart.
DESCRIPTORS: *Collision avoidance, *Air traffic control systems, *Discrete address beacon systems, *Transponders, Air traffic, Density, Radar beacons, Area coverage, Low altitude, Radiofrequency interference, Interrogator transmitters, Accuracy, Computerized simulation (U)
IDENTIFIERS: BCAS(Beacon Collision Avioidance System), Garble (U)

A unique airborne aircraft collision avoidance system concept is presented which assures adequate separation from the largest possible percentage of potential collision threats. The concept operates in all airspace as a compatible backup to the present and evolving ATC system, and is acceptable to the pilot and the user community. The system concept capitalizes on the aviation community's large existing investment in ATCRBS transponders and on the ground based beacon surveillance system network for the basic sources of the collision avoidance information. The appendices in this volume include: Garble; BCAS Mode Selection; Traffic Models and Aircraft densities; Radar coverage, and BCAS Accuracy Analysis. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A061 921 1/2 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Helicopter Operations Development Plan. (U)

DESCRIPTIVE NOTE: Program plan rept.
SEP 78 116P
REPT. NO. FAA-RD-78-101

UNCLASSIFIED REPORT

DESCRIPTORS: *Helicopters, *Flight paths, *Air traffic control systems, *Heliports, Air space, Flight maneuvers, Instrument flight, All weather aviation, Deicing systems, Planning programming budgeting, Aviation safety, Aircraft noise, Standards, Regulations (U)
IDENTIFIERS: Crashworthiness (U)

The Helicopter Operations Development Plan is designed to provide for upgrading and development of all those criteria, standards, procedures, systems, and regulatory activities which will allow safe, timely and economical integration of the helicopter into all-weather operations in the National Airspace System. It describes a five-year development program whose objectives is to improve the National Airspace System so as to enable helicopters to employ their unique capabilities. It includes the collection of data (both near and long term) for use by the FAA and others to ensure full integration into the NAS of this rapidly growing segment of aviation. These areas are covered in the plan: (1) IFR Helicopter Operations; (2) Navigation Systems Development; (3) Communication Systems Development; (4) Helicopter Air-Traffic Control; (5) Weather Environment; (6) All-Weather Heliport Development; (7) IFR Helicopter Certification Standards; (8) Helicopter Icing Standards; (9) Helicopter Crashworthiness and (10) Helicopter Noise Characterization. The FAA groups, other Federal Government agencies and other organizations participating in this effort are identified. Program management responsibilities are addressed. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A061 859 1/5
CHAMPLAIN TECHNOLOGY INDUSTRIES PALO ALTO CALIF

Impact of Area Navigation on Controller Productivity and ATC System Capacity. (U)

DESCRIPTIVE NOTE: Final rept. Nov 76-Jan 78,
JAN 78 189P Bolz,Eric H. ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA-RD 78-51

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Air traffic, Productivity, Work, Navigation, Delay, Arrival, Terminal flight facilities, Costs, Savings, Time, Fuel consumption (U)

This report provides a detailed analysis of the impact of Area Navigation (RNAV) on ATC controller's tasks and the resulting productivity of control sectors, and of the impact on airport and enroute system capacities. The results are expressed in terms of projected savings in ATC controller staff growth requirements (man-years and dollars), and in terms of savings in aircraft delays (aircraft time and fuel consumption, and dollars). The terminal area and enroute (high and low altitude) environments were considered separately. The analysis considered the time period from 1982 to 2000. The effects of other features of the Upgraded Third Generation ATC System on controller tasks and system capacity were considered directly in each analysis. All dollar results were computed as 1976 present value equivalents which were used to update a comprehensive RNAV benefit/cost analysis from an earlier report under this contract. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A061 709 17/7 1/3
CHAMPLAIN TECHNOLOGY INDUSTRIES WEST PALM BEACH FL

Air Force/National Airspace System Interface Study. (U)

DESCRIPTIVE NOTE: Final technical rept. Sep 77-Jan 78,
JUN 78 91P Bolz,E. H. ;
CONTRACT: F33615-77-C-3079
PROJ: 2403
TASK: 02
MONITOR: AFFDL TR-78-69

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Avionics, Air Force, Military aircraft, Commercial aircraft, Civil aviation, Air space, Compatibility, Integrated systems (U)
IDENTIFIERS: National Airspace System, WUAFFDL24030237, PE62201F (U)

This report documents the results of a study to determine what actions the Air Force should be taking to remain compatible with the National Airspace System as it evolves in the future. The Federal Aviation Administration (FAA), through implementation of the Upgraded Third Generation Air Traffic Control System, will be requiring new avionics functions in aircraft which operate in the Air Traffic Control System. A large number of Air Force aircraft regularly operate in the Air Traffic Control system and so are affected by changes to its structure. The purpose of this study was to determine those FAA plans or programs which will impact avionics requirements, to analyze the major new avionics development plans of the Air Force, and to determine the interface problems which will then exist for Air Force aircraft operation in the National Airspace System. (Author) (U)

AD-A061 336 1/5
IIT RESEARCH INST ANNAPOLIS MD

Automated VHF Frequency Assignment System (FAS) for FAA Air Traffic Control Communications. Supplement 1. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 78 18P Hensler,Thomas C. ;
CONTRACT: F19628-78-C-0006, DOT-FA76WAI-612
MONITOR: ECAC,FAA-RD PR-76-005-SUPPL-1,76-14-SUPPL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supplement to report dated Feb 76, AD-A024 428.
DESCRIPTORS: *Frequency allocation, *Air traffic control systems, Very high frequency, Game theory, Automatic, Computerized simulation, Air traffic, Radiofrequency interference (U)
IDENTIFIERS: FAS(Frequency Assignment System), Violations, Communication channels, Spectrum management, Channel separation (U)

An automated Frequency Assignment System (FAS) was developed as a means of providing frequency assignment plans for FAA Air Traffic Control (ATC) VHF communications facilities. The FAS consists of a series of computer models described in FAA-RD-76-14. The system can be used for assignment gaming including partial and complete assignments, detecting violators, statistical analyses, and plots of service volume. This report describes improvements made to the FAS during 1977 and supplements FAA-RD-76-14. (Author) (U)

AD-A061 138 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Radar Station Evaluation Report, Ellsworth AFB, South Dakota, 11-21 July 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 78 68P Chaumont,Roderick C. ;
REPT. NO. 78/66R-134

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Radar equipment, *Operational effectiveness, Air traffic control systems, Test and evaluation, Radar tracking, Flight control systems, Performance(Engineering), Predictions, Reliability (U)
IDENTIFIERS: RAPCON(Radar Approach Control), Ellsworth AFB, AN/FPN-47, AN/TPX-42, ATCRBS(Air Traffic Control Radar Beacon System), TRACALS(Traffic Control and Landing System) (U)

This radar station evaluation report presents data collected from 11-21 July 1978 to define capabilities and limitations of the radar approach control (RAPCON) facility at Ellsworth AFB, South Dakota. This report includes descriptions of the useable ASR and ATCRBS coverage and tracking capabilities, analysis of all flight equipment performance data, and the performance predictions for each system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A061 077 5/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Survey of Radar Simulation Training at ATC Field Facilities. (U)

DESCRIPTIVE NOTE: Final rept. Jun 77-Mar 78,
SEP 78 52P Karovic,Stephen ;Rundall, Theodore ;
REPT. NO. FAA-NA-78-27
MONITOR: FAA-RD 78-77

UNCLASSIFIED REPORT

DESCRIPTORS: *Training, *Air traffic control systems, *Air traffic controllers, Simulation, Radar, Requirements, Targets (U)
IDENTIFIERS: LPN-FAA-216-103-100 (U)

The results of a system-wide review of the current air traffic control enroute and terminal radar simulation training capability are discussed. Teams of air traffic controllers from NAFEC and from the field, with engineering support, visited 10 en route air traffic control centers and 17 terminals equipped with Automated Radar Terminal Systems (ARTS III). Training personnel from three other ARTS III facilities were interviewed. It was found that the field simulation systems, although originally designed only as software checkout tools, now provide the field facilities with a radar training capability far surpassing that previously possible. However, despite the generally wide acceptance and acclaim given this new capability, shortcomings were uncovered which limit the training effectiveness and full utilization of the system. These shortcomings, including problems with equipment, software, staffing, etc., are identified and discussed. Specific recommendations are made for the purpose of enhancing air traffic control radar simulation training in field facilities, including software modifications, increased staffing, improved communications, and, in terminals, an increased number of displays. (Author) (U)

AD-A060 727 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

FAA Aviation Forecasts Fiscal Years 1979-1990. (U)

SEP 78 93P
REPT. NO. FAA-AVP-78-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic, *Air transportation, *Forecasting, Air traffic control systems, Air traffic control terminal areas, Public opinion, Airports, Military aircraft, Commercial aircraf (U)

This Federal Aviation Administration (FAA) report contains the official FAA forecasts of domestic aviation activity for Fiscal Years 1979 through 1990. It presents forecasts of aviation activity levels at FAA towered airports, air route traffic control centers, and flight service stations, as well as forecasts of aviation activity for air carriers, air taxis, general aviation, and the military--the four major users of the National Aviation System (NAS). In addition, this report presents the complete FAA aviation forecasting system, and describes the FAA's ongoing initiative to improve the decisionmaking utility of that system for the overall aviation community. It focuses on the FAA's interpretation of commentary received from the community, and on the agency's response to that commentary. (Author) (U)

AD-A060 364 17/7 17/2.1 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, McConnell AFB, Kansas. 17-24 July 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 78 62P Mason,Kenneth G. ;
REPT. NO. 78/66C-133

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radio links, *Ground controlled approach radar, *Airport radar systems, Test and evaluation, Airport control towers, Area coverage, Electric cables, Antenna feeds, Kansas (U)
IDENTIFIERS: TRACALS(Traffic Control and Landing System), Traffic Control and Landing System, McConnell Air Force Base, RIVET SWITCH Project, Horizon profiles (U)

A Traffic Control and Landings System (TRACALS) Communications Evaluation was performed at McConnell AFB, Kansas from 17-24 July 1978 to define the capabilities and limitations of the communications system servicing the ground controlled approach radar and control tower. This report can be used as a guide for anticipated performance at McConnell AFB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would affect the system. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A060 340 17/7 13/1 14/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Boston Air Route Traffic Control Center (ARTCC) Lighting Study. (U)

DESCRIPTIVE NOTE: Final rept. Apr-Nov 76,
JUL 77 34P Mitchell,Robert H. ;Sulzer, Richard L. ;Kopala,Alan J. ;
REPT. NO. FAA-NA-77-13
MONITOR: FAA/RD 77-50

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also rept. no. FAA/RD-76-203, AD-A041 324.
DESCRIPTORS: *Air traffic control systems, *Lighting equipment, *Display systems, Aviation safety, Efficiency, Operational effectiveness, Commercial aviation, Visibility (U)
IDENTIFIERS: PVD(Plan View Display), *Plan View Display (U)

The purpose of this project was to facilitate the viewing of flight data on plan view displays (PVD's) and the reading of other pertinent data in the ARTCC control room by air traffic controllers. This was accomplished by attenuating distracting light and reflections on the PVD face and increasing the ambient room lighting level. In implementing these objectives, the work consisted of modifying various parts of air traffic control (ATC) equipment in the assigned test area D of the control room. the lighting modifications were evaluated technically by Raytheon and were appraised by a survey, conducted by NAFEC, of the air traffic controllers. The package of modifications was well received by the controllers, but they considered it inadequate and desired more effective improvements. The results of the study indicate that discrete lighting modifications only partially solve the reflection/lighting problem. (Author) (U)

AD-A060 257 1/5 14/2
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

TRACALS Evaluation Report. ATC Communications Station Evaluation Report Zaragoza AB, Spain, (11-22 Jan 78). (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 78 97P Collier,John D. ;
REPT. NO. 78/68C-28

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication equipment, *Air traffic control systems, *Test and evaluation, Systems analysis, Reports, Performance(Engineering), Spain, Radiation patterns, Specifications, Instruction manuals (U)
IDENTIFIERS: TRACALS(Traffic Control and Landing System), Communications stations, Zaragoza AFB (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at Zaragoza AB, Spain from 11 to 22 January 1978. The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control (ATC) Communications System. Included in this report are the results and analysis of equipment checks, system line level measurements, plots of radio line of sight coverage, receive signal levels (RSL) and radiation patterns. Other items contained in this report are system alignment procedures, equipment specifications and the results of investigations conducted to determine the effects of screening on ground-to-ground communications. The data and diagrams used in this report can be used as a guided for anticipated performance of the communication system at Zaragoza AB until there is an addition, deletion, relocation of equipment or a change in the horizon profile which would effect the system. (Author) (U)

AD-A060 145 17/7 1/5 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, Grissom AFB, Indiana, 13 - 20 June 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 78 64P Mathews,Allen C. ;
REPT. NO. 78/66C-130

UNCLASSIFIED REPORT

DESCRIPTORS: *Ground controlled approach radar, *Air traffic control systems, *Communication and radio systems, Approach, Aircraft landings, Ground support equipment, Specifications, Radio receivers, Radio transmitters (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at Grissom AFB, Indiana from 13-20 June 1978 to define the capabilities and limitations of the communications system servicing the radar approach control (RAPCON) and control tower. This report can be used as a guide for anticipated performance at Grissom AFB until there is a change of equipment or a change in horizon profile which would affect the system. (Author) (U)

AD-A060 001 17/7 1/2 17/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, King Salmon Airport, Alaska. 19 - 28 June 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 78 64P Pinney,Earl T. , Jr;
REPT. NO. 78/66C-132

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Ground controlled approach radar, *Airport radar systems, *Radio links, Landing fields, Ultrahigh frequency, Test and evaluation, Mobile, Alaska (U)
IDENTIFIERS: TRACAL(Traffic Control and Landing System), Traffic Control and Landing System, King Salmon airport, Rivet Switch project, Horizon profiles, F-4 aircraft (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at King Salmon Airport, Alaska (Det 5, 1931 Comm Gp) from 19-28 June 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the MRAPCON. The data and diagrams in this report can be used as a guide for anticipated performance of the communications system at King Salmon Airport, including the projected installation of the Rivet Switch equipment, until there is a change of equipment, or a change in horizon profile which would effect the system. (Author) (U)

AD-A059 943 17/9 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Special Evaluation Report, Precision Approach Radar, Barksdale AFB, Louisiana, 18-22 August 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 78 8P Pinney,Earl T. , Jr;
REPT. NO. 78/66S-137

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Control Systems, *Ground controlled approach radar, *Airport radar systems, *Moving target indicators, Landing fields, Test and evaluation, Louisiana (U)
IDENTIFIERS: Barksdale Air Force Base, AN/FPN-16, Precision approach radar, PAR(Precision Approach Radar), Linear polarization, Circular polarization, Airport surveillance radar, Feed horns (U)

This traffic control and landing systems (TRACALS, special evaluation report presents data collected from 18-22 August 1978, to investigate the weak moving target indicator reflector returns present when linear polarization was selected. It describes the corrective actions taken and recommends a permanent solution to correct the problem. (Author) (U)

AD-A059 729 17/7 17/2.1
OFFICE OF TELECOMMUNICATIONS BOULDER COLO INST FOR TELECOMMUNICATION SCIENCES

Examination and Prediction of Problems Associated with Collocating ATC-VHF Communication Systems, (U)

DEC 75 121P Hartman,W. J. ;Tary,J. J. ;
CONTRACT: DOT-FA74WAI-447
MONITOR: FAA-RD 75-157

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Position finding, Air traffic, Aviation safety, Electromagnetic compatibility, Radio receivers (U)
IDENTIFIERS: AN/GRR-23 (U)

Problems associated with collocating air traffic control-VHF communications systems are investigated for the purpose of comparing predicted results with measurements, and comparing laboratory measurements with measurements taken at operating sites. It is reaffirmed that the characteristics of specific equipments are one of the most important variables, and these characteristics can be adequately measured in the laboratory for predicting their effects in an operational environment. (Author) (U)

AD-A059 703 1/5 14/2 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

A Breadboard Model Used to Demonstrate the Feasibility of Recording National Airspace System Enroute Display Data. (U)

DESCRIPTIVE NOTE: Final rept. Sep 75-Sep 77,
SEP 78 33P Mack,Edwin A. ;Stratoti, Stephen D. ;Hinkley,Lane G. ;
REPT. NO. FAA-NA-78-32
MONITOR: FAA-RD 78-97

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Breadboard models, *Data reduction, *Data displays, *Data processing equipment, Data storage systems, History, Recording systems, Reproduction(Copying), Air traffic (U)
IDENTIFIERS: Single channel, Display control vector generator, LPN-FAA-122-113-510 (U)

A feasibility investigation was made of various techniques for providing the capability of re-creating or replaying on demand air traffic histories for operational or incident analysis. To demonstrate feasibility, the best technique was selected and a single-thread breadboard model designed and fabricated. It was concluded that the single-channel breadboard model, employing the digital recording technique and utilizing the Display Control Vector Generator input area as the data recording point, adequately demonstrated the feasibility of recording, storing, and reproducing NAS en route air traffic control display data. Based upon this successful demonstration, it was recommanded that a full-scale multiple-channel engineering model be designed, fabricated, and evaluated. (Author) (U)

AD-A059 535 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

The FAA Concept for a Beacon Collision Avoidance System (BCAS). Volume II. Concept Description, (U)

APR 78 268P Koenke ,E. J. ;
REPT. NO. FAA-EM-78-5-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A056 930.
DESCRIPTORS: *Collision avoidance, *Air traffic control systems, *Discrete address beacon systems, *Transponders, Directional antennas, Air space, Flight paths, Signal processing, Message processing, Data links, Synchronization(Electronics), Radar beacons, Algorithms (U)
IDENTIFIERS: Beacon collision avoidance systems, BCAS(Beacon Collision Avoidance Systems) (U)

A unique airborne aircraft collision avoidance system concept is presented which assures adequate separation from the largest possible percentage of potential collision threats. The concept operates in all airspace as a compatible backup to the present and evolving ATC system, and is acceptable to the pilot and the user community. The system concept capitalizes on the aviation community's large existing investment in ATCRBS transponders and on the ground based beacon surveillance system network for the basic sources of the collision avoidance information. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A059 471 5/9 17/9
AIR FORCE OCCUPATIONAL MEASUREMENT CENTER LACKLAND AFB TEX

Air Traffic Control Radar Repairman Specialty, AFSC 30351. (U)

DESCRIPTIVE NOTE: Final rept. Apr-Jun 77,
SEP 77 54P O'Connor,Thomas J. ;Weber, Elena J. ;Ruck,Hendrick W. ;
REPT. NO. AFPT-90-303-222

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar, *Maintenance personnel, *Specialists, *Careers, Jobs, Repair, Air Force personnel, Air Force training (U)

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned to Air Traffic Control Radar Repairman Specialty (AFSC 30351). The report gives a detailed listing of the technical tasks and knowledge needed to perform the jobs within the specialty or career ladder. This specialty has the following functions: Installs, maintains, and repairs air traffic control radar, related operator training devices, associated communications subsystems, radar beacon systems, remoting systems, video mappers, and computerized processing devices. Performs preventive maintenance on air traffic control radar, associated communications equipment, radar beacon systems, remoting devices, video mappers, and display equipment. (Author) (U)

AD-A059 296 17/2 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report Keesler AFB, Mississippi. 15-23 May 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 78 68P Mathews,Allen C. ;
REPT. NO. 78/66C-126

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, *Air traffic control terminal areas, Air Force facilities, Test and evaluation, Limitations, Performance tests, Communication equipment, Radio equipment (U)
IDENTIFIERS: TRACALS(Traffic Control and Landing Systems), Traffic Control and Landing Systems, Communications station evaluation, Evaluation reports, Keesler AFB, AN/FRC-198 (U)

A Traffic Control and Landing Systems (TRACALS) Communications Sation Evaluation was performed at Keesler AFB, Mississippi (2052 Comm Sq) from 15-23 May 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the control tower. The data and diagrams in this report can be used as a guide for anticipated performance of the communications system servicing the control tower. The data and diagrams in this report can be used as a guide for anticipated performance of the communications system at Keeler AFB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would effect the system. (Author) (U)

AD-A059 071 17/7 17/2.1
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

TRACALS Evaluation Report. Communications Station Evaluation Report, Sembach AB, Germany. 17-27 October and 28 November-2 December 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 78 98P Minsterl,James R. ;
REPT. NO. 77/68C-26

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communications networks, High frequency, TACAN, Air traffic control terminal areas, Test and evaluation, Communication and radio systems, West Germany, Line of sight, Radar antennas (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Sembach AB, Germany (2134 Comm Sq), 17-27 October and 28 November 2 December 1977. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications system. Included in this report are results and analysis of equipment checks, single line audio level diagrams for the GCA and control tower systems, radio line of sight coverage data and analysis of airborne measurements. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communication system until there is an addition, deletion, relocation of equipment or a change in the horizon profile which would affect the system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A059 008 1/5 9/2 14/1
ARINC RESEARCH CORP ANNAPOLIS MD

User Delay Cost Model and Facilities Maintenance Cost Model for a Terminal Control Area. Volume III. User's Manual and Program Documentation for the Facilities Maintenance Cost Model. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Sep 76,
MAY 78 49P Greene,L. B. ;Witt,J. ;
Sternberg-Powidzki,M. ;
CONTRACT: DOT-TSC-1173
MONITOR: FAA-AFF,TSC 220-78-01-3,FAA-78-1.3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A059 007.
DESCRIPTORS: *Air traffic control terminal areas, *Cost models, *Computerized simulation, *Computer programs, Manuals, Delay, Scheduling, Maintenance management, Approach, Preventive maintenance, Manpower, Cost analysis, Test and evaluation, Weather forecasting (U)
IDENTIFIERS: Boston Terminal Control Area, User delay cost model, UDCM(User Delay Cost Model) (U)

The Facilities Maintenance Cost Model (FMCM) is an analytic model designed to calculate expected annual labor costs of maintenance within a given FAA maintenance sector. The model is programmed in FURTRAN IV and has been demonstrated on the CDC Kronos time-sharing system. Model inputs are facility identification data, maintenance support scenarios, and facility reliability and maintainability data. The principal model outputs include the expected annual direct labor and salary costs of maintaining a specific facility type within a sector, the required number of personnel by skill level for that facility type, the costs of preventive maintenance and corrective maintenance, and the costs of call-backs. The model also provides total cost and labor data on all of the facilities within the sector. This is the third of three volumes. Volume I documents the model formulation and demonstration. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A059 007 1/5 14/1 9/2
ARINC RESEARCH CORP ANNAPOLIS MD

User Delay Cost Model and Facilities Maintenance Cost Model for a Terminal Control Area. Volume I. Model Formulation and Demonstration. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Sep 76,
MAY 78 125P Greene,L. B. ;Witt,J. ;
Sternberg-Powidzki,M. ;
CONTRACT: DOT-TSC-1173-1
MONITOR: FAA-AAF,TSC 220-78-01-1,FAA-78-1.1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A058 984.
DESCRIPTORS: *Air traffic control terminal areas, *Cost models, *Computerized simulation, Maintenance management, Delay, Scheduling, Approach, Preventive maintenance, Manpower, Cost analysis, Test and evaluation, Weather forecasting (U)
IDENTIFIERS: User delay cost model, UDCM(User Delay Cost Model), Boston Terminal Control Area, FMCM(Facility Maintenance Cost Model), Facility maintenance cost model (U)

The User Delay Cost Model (UDCM) is a Monte Carlo computer simulation of essential aspects of Terminal Control Area (TCA) air traffic movements that would be affected by facility outages. The model can also evaluate delay effects due to other factors, such as weather, aircraft schedule intensity, and approach minima. Although the Boston TCA was selected as the study vehicle for development and demonstration, the model is structured so that it can be applied to other TCAs. The Facility Maintenance Cost Model (FMCM) is designed to evaluate the expected annual labor cost of maintaining FAA facilities within a maintenance sector. The model was developed for time-share computer application and can evaluate both the preventive maintenance and corrective maintenance required by any single facility (e.g., a visual omni-range or VOR), accumulate staffing and cost data on similar facilities (e.g., all VORs) within the specified maintenance sector. (U)

AD-A059 006 17/7 1/5 5/8
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Systems Integration Analysis for Future Tower Cab Configurations/Systems. (U)

DESCRIPTIVE NOTE: Interim rept. Jul-Oct 77,
JUN 78 214P Hobbs,V. J. ;Clapp,D. F. ;Rempfer,P. ;Stevenson,L. E. ;Devoe,D. ;
REPT. NO. TSC-FAA-78-6
MONITOR: FAA-EM 78-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of Rept. nos. FAA-EM-77-10/(DOT-TSC-FAA-77-19), AD-A048 306 and FAA-EM-77-16/(DOT-TSC-FAA-78-2), AD-A054 608.
DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Airport control towers, Airport radar systems, Air traffic controllers, Systems analysis, Display systems, Information processing, Data processing, Integrated systems, International Airports, Performance(Human), Man machine systems (U)

This report presents the results of the analysis of various aspects of the integration of future ATC systems into the tower cab. The impact on the tower cab environment is analyzed from several points of view: how the systems information and displays might be used to approach idealized controller station configurations; how the cab equipment and displays resulting from these systems might be fitted into existing controller station configurations; how those systems--some not yet fully defined--might evolve and interact with the present and future systems; how the data-processing functions and equipment might be integrated; and how, or if, economies might be achieved through common siting of certain system sensors. (U)

AD-A058 996 17/7 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

False Discrete Targets in the En Route System. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 78 114P Shannon,James A. ;
REPT. NO. FAA-RD-78-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. FAA/RD-77/12-4, AD-A056 941.
DESCRIPTORS: *Plan position indicators, *False targets, *Air traffic control systems, *Radar beacons, Backlobes, Radar pulses, Radar targets, Aerial targets, Multipath transmission, Target discrimination (U)
IDENTIFIERS: Ringaround targets, Radar transponders, Range bins, Split targets, Multipath targets, LPN-FAA-122-111-02 (U)

This report describes the results of a two year study concerning the problem of false discrete target reports which appear in en route system. False target rates from selected secondary radar sites in the en route system are given. Six candidate fixes which attack the problems associated with these rates are examined. False reports are divided into ringaround, splits, and reflections. A false report not classified as a ringaround or a split is classifed as a reflection. Several fixes against the ringaround type of false target are available and one of them, based on the double coverage provided in the en route system, is recommended for implementation. A fix against the split type of false target report is available and consideration of implementation is recommended. A fix against the reflection type of false target is recommended in the special case where the physical reflector can be identified. (Author) (U)

AD-A058 984 1/5 14/1 9/2
ARINC RESEARCH CORP ANNAPOLIS MD

User Delay Cost Model and Facilities Maintenance Cost Model for a Terminal Control Area. Volume II. User's Manual and Program Documentation for the User Delay Cost Model. (U)

DESCRIPTIVE NOTE: Final rept. May-Sep 76,
MAY 78 195P Greene,L. B. ;Witt ,J. ;
Sternberg-Powidzki,M. ;
CONTRACT: DOT-TSC-1173
MONITOR: FAA-AAF,TSC 220-78-01-2,FAA-78-1.2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A059 008.
DESCRIPTORS: *Air traffic control terminal areas, *Cost models, *Computerized simulation, *Computer programs, Manuals, Delay, Scheduling, Maintenance management, Approach, Preventive maintenance, Manpower, Cost analysis, Test and evaluation, Weather forecasting (U)
IDENTIFIERS: Boston terminal control area, User delay cost model, UDCM(User Delay Cost Model) (U)

The User Delay Cost Model (UDCM) is a Monte Carlo simulation of certain classes of movement of air traffic in the Boston Terminal Control Area (TCA). It incorporates a weather module, an aircraft generation module, a facilities module, and an air control module to simulate delays, resulting from facility outage, imposed on four user classes: Air Carrier, Air Taxi, General Aviation, and Military Aircraft. The model can also be used to measure delays due to changing aircraft arrival rates, weather and other environmental considerations, approach types available, or any other factor that affects trail separation in final approach of the maximum number of aircraft an air controller can handle. This is the second of three volumes. Volume I documented the model formulation and demonstration. Volume III is a user's manual and program documentation for the facilities maintenance cost model. (Author) (U)

AD-A058 729 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Radar Station Evaluation Report, Zaragoza AB, Spain, 11-21 January, 30 January-6 February, 1978. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
MAY 78 84P Minsterl,James R. ;
REPT. NO. 78/68R-29

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar beacons, *Air traffic control systems, *Airports, Spain, Search radar, Instrument landings, Video mapping, Perimeter acquisition radar, Radar tracking, Power supplies, Performance(Engineering), Test and evaluation, Air Force facilities (U)
IDENTIFIERS: AN/MPN-14E, AN/TPX-42, AN/GPA-131 (U)

This Traffic Control and Landing Systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the mobile radar approach control (MRAPCON) facility at Zaragoza AB, Spain. The MRAPCON is comprised of an AN/MPN-14E airport surveillance/precision approach radar, AN/TPX-42(A)V type 2 air traffic control radar beacon system, AN/GPA-131 video mapping system, and associated power systems. This report includes descriptions of the useable ASR coverage and tracking capabilities, the PAR coverage and capabilities, the analysis of flight and equipment performance data for the ASR, ATCRBS, and PAR systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (U)

AD-A058 654 17/9 1/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Uplink ATCRBS Environment Measurements Along the Boston-Washington Corridor. Volume 1. The RF Environment. (U)

DESCRIPTIVE NOTE: Project rept., JUN 78 26P Nagy,Ferenc , Jr;
REPT. NO. ATC-83-VOL-1
CONTRACT: F19628-78-C-0002, DOT-FA71WAI-242
MONITOR: FAA/RD 78/33-VOL-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Flight paths, Measurement, Recording systems, Suppression, Rates, Altitude (U)
IDENTIFIERS: LPN-FAA-052-241-04 (U)

Airborne measurements of the Air Traffic Control Radar Beacon System (ATCRBS) 1030 MHz uplink environment due to ATC ground interrogators are described. The measurements were made using a special purpose airborne sensor-recorder during a flight from Boston to Washington (at 8500 feet) and back (at 17,500 feet) on 16 December 1977. Data were recorded at 24 locations between Boston and Washington and processed to obtain distributions of pulse, interrogation, and suppression rates with received power. The most numerous contributors to the uplink pulse environment are omnidirectionally radiated suppression pulses. The overall average suppression rate is approximately 600 per second. The suppression rate is relatively independent of altitude but there are wide variations in the suppression rate from one location to another. Interrogation rates increase with altitude but do not vary significantly from location to location except near interrogators without sidelobe suppression. The overall average rate of receipt of Mode A plus Mode C interrogations is approximately 75 per second at an altitude of 8500 feet and 100 per second at an altitude of 17,500 feet. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A058 549 1/5 5/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Engineering and Development Program Plan - Central Flow Control System. (U)

DESCRIPTIVE NOTE: Rept. for calendar year 1977-1978. AUG 78 99P
REPT. NO. FAA-ED-11-1A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. FAA-ED-11-1.
DESCRIPTORS: *Air traffic control systems, Planning, Centralized, Management, Automation, Predictions, Air traffic control terminal areas, Regulations, Flow, Airports, Delay, Fuels, Savings, Capacity(Quantity), Logistics (U)
IDENTIFIERS: Central air traffic control system (U)

The Central Flow Control System is being developed as a centralized automated air traffic prediction/management system. It will regulate the flow of traffic to an airport, allow for ground holding delays, and minimize airborne delays resulting in significant fuel savings and the smoothing of traffic flow to coincide with airport capacity. This Program Plan supersedes Engineering and Development Program Plan number FAA-ED-11-1, ATC Systems Command Center Automation, dated August 1971. (Author) (U)

AD-A058 457 17/7
ARINC RESEARCH CORP ANNAPOLIS MD

Development and Evaluation of Selective Address Beacon (SAB) System. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 78 117P Kowalski,S. H. ;
REPT. NO. 1326-11-2-1734
CONTRACT: DOT-FA76WA-3788

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Addressing, *Transponders, Reliability, Synchronization(Electronics), Identification systems, Coding, Labels, Line of sight, Costs (U)
IDENTIFIERS: SAB(Selective Address Beacon), Selective address beacon, Synchronous garble, Air traffic control radar beacon systems (U)

This report presents the results of the development and evaluation of a selective address beacon system intended to reduce or eliminate synchronous garble in dense airspace. Two concepts are developed and evaluated, depending on the expected application of SAB as either an interim or long-term solution of the synchronous garble problem. The degree of improvement expected from each concept is evaluated and the communications reliability is analyzed. Avionics designs supporting the concepts are developed and avionics cost estimated for the air carrier and general aviation classes of aircraft.. (Author) (U)

AD-A058 082 5/9 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Development of a Performance Criterion for Air Traffic Control Personnel Research through Air Traffic Control Simulation. (U)

DESCRIPTIVE NOTE: Final rept. Jan 75-Oct 77,
JUL 78 99P Buckley,Edward P. ;House, Kenneth ;Rood,Richard ;
REPT. NO. FAA-NA-78-9
MONITOR: FAA-RD 78-71

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Performance(Human), Simulation, Air traffic control systems, Radar equipment, Measurement, Reliability (U)
IDENTIFIERS: LPN-FAA-216-101-100 (U)

This report gives the theory of an approach to objective measurement of the radar control performance of air traffic controllers, by means of air traffic control simulation exercises. A set of objective measurements developed for the NAFEC Air Traffic Control Simulation Facility is described. The relevance of this same measurement technique for either evaluating new systems (when the same or similar controller teams are functioning) or for evaluating various controller individuals or teams (when they are using the same system to control traffic) is discussed. Other applications are also described. The ability of the simulator to repeatedly present the same traffic samples is stressed as a means of accumulating comparable and normative data. The need for basic experimentation for validation of the test measurement system and to develop further knowledge and understanding of the measurements is recognized. A relatively small keystone experimental design is described and recommended as the first essential step for all possible applications. The availability of adequate numbers of controllers as subjects is recognized as the major problem to be overcome. Development of a means for transmitting tests originating in NAFEC's simulator to field sites is recommended. (Author) (U)

AD-A057 935 17/2.1 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

The Selection of ILS Localizer Antenna Patterns for Use in the Frequency Assignment Process. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 78 250P Smith,Robert D. ;
REPT. NO. FAA-RD-77-130

UNCLASSIFIED REPORT

DESCRIPTORS: *Frequency allocation, *Air traffic control systems, *Instrument landings, Electromagnetic compatibility, Antenna radiation patterns, Comparison, Loop antennas, Dipole antennas, Antenna arrays, Calibration (U)
IDENTIFIERS: AN/MRN-7 (U)

The frequency assignment process is meant to insure interference-free service within the service volume. This is done by choosing frequencies in a manner which provides certain minimum cochannel and adjacent channel desired to undesired signal ratios at critical points of the service volume. One of the factors which affects a station's signal strength in space is its horizontal antenna pattern. ILS localizer antennas have undergone significant changes in recent years. In order to reduce siting effects, antenna patterns have evolved from the nearly omnidirectional 8-loop to the highly directional traveling wave and log periodic dipole antennas. The horizontal localizer antenna pattern now has a substantial effect on the separation required between localizer stations. This report compares measured and theoretical data with FAA antenna pattern specifications. For each antenna type, a single horizontal antenna pattern is recommended for use in the frequency assignment process. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A057 933 17/7 1/5 17/2.1
BENDIX CORP BALTIMORE MD COMMUNICATIONS DIV

Design, Fabrication, and Testing of a Brassboard Model ATCRBS Based Surface Trilateration Data Acquisition Subsystem. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Dec 77,
JUN 78 184P Brockway,A. L. ;Kuhl,J. B. ;Woodall,P. J. ;
REPT. NO. BENDIX-489A09A
CONTRACT: DOT-TSC-769
MONITOR: FAA-RD,TSC 78-63,FAA-78-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Ground traffic, Taxiing, Ground roll(Aeronautics), Aprons, Runways, Transponders, Radar beacons, Data acquisition, Brassboard models, Voice communications, Interrogator transmitters, Electromagnetic interference, Triangulation (U)

Field test results are emphasized in this report, which also contains background information on Air port Surface Traffic Control (ASTC) and the contract objectives. The NATIONAL Aviation Facilities Experiimental Center (NAFEC) field test series conclusively proved the technical feasibility of an Air Traffic Control Radar Beacon System (ATCRBS) based Airport Surface Traffic Control sensor system. Operational Data Acquisition Subsystem (DAS) performance projections developed to date as a result of the National Aviation Facilities Experimental Center test series are presented, and a recommendation for pursuit of Contract Option 2 is substantiated. (Author) (U)

AD-A057 280 17/9 20/14
NATIONAL AVIATION FACI''TIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Terminal Radar Interference Criteria Study. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Dec 76,
JUN 78 85P Kenton,John ;
REPT. NO. FAA-NA-77-20
MONITOR: FAA/RD 78/75

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Radiofrequency interference, Air traffic control terminal areas, Air traffic controllers, Algorithms, Radar pulses, Radar, Simulators, Degradation, Display systems, Human factors engineering, S band, Radar operators, Radar beacons (U)
IDENTIFIERS: ASR-5 radar, ASR-7 radar, Power bins, LPN-FAA-213-061-110 (U)

Tests were undertaken to investigate the relationship between pulsed-type interference and the air traffic controller working in the terminal area. This was done by recording a series of pulsed-type interference cases and combining them with simulated analog radar targets to form a set of scenarios for display to a group of Federal Aviation Administratic (FAA) controllers. Several operational responses were used as performance measures to investigate interference criteria. The interference cases were then quantified and ordered based on two indexing schemes. Tests based on the indices and the performance measures revealed that correlations exist between the operational responses and the interference cases. (Author) (U)

AD-A057 177 17/7 1/2
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT NEUILLY-SUR-SEINE (FRANCE)

Guidance and Control Design Considerations for Low-Altitude and Terminal-Area Flight. (U)

DESCRIPTIVE NOTE: Conference proceedings.
APR 78 317P
REPT. NO. AGARD-CP-240

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Guidance and Control Panel Symposium, 17-20 Oct 77, Dayton, OH.
DESCRIPTORS: *Air traffic control systems, *Flight control systems, Low altitude, Aircraft landings, Airmobile operations, Weapon delivery, Terminal guidance, Terrain avoidance, Terrain following, All weather aviation, Instrument landings, Vertical takeoff aircraft, Symposia (U)
IDENTIFIERS: NATO furnished (U)

Future operational needs dictate that conventional and VTOL aircraft and helicopters will be operated close to the ground in a wide range of operational tasks and weather conditions. The proximity of the ground produces many common factors that apply in all such situations. In particular, these relate to the precision and modes of control of the aircraft subject to special environmental conditions near the ground, the requirements for sensing position relative to ground features and the high importance of establishing the necessary safety, integrity standards commensurate with the vulnerability to enemy defenses. This symposium presented recent state-of-the-art in technology to achieve operational capability under adverse weather conditions, and stressed the need for integrity and safety while operating in close proximity to the ground. Of interest for some are the advanced techniques in achieving direct lift control and technology to improve the aircraft resistance to disturbances such as wind shear and gust. (U)

AD-A057 143 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Special Evaluation Report (Interim). QOT and E of the AN/GRN-29(V) SSILS, Holloman AFB, New Mexico, 17-29 May 1978. (U)

JUL 78 110P Nix,Paul W. ;
REPT. NO. 78/66S-128

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Landing aids, *Air traffic control systems, Test and evaluation, Performance(Engineering), Operational effectiveness, Glide slope, Power supplies, Radio beacons (U)
IDENTIFIERS: AN/GRN-29, Holloman Air Force Base (U)

This report presents data collected and analyzed to evaluate the operational effectiveness of the new AN/GRN-29(V) SSILS at Holloman AFB, New Mexico. The results of the evaluation indicate that this system is capable of providing satisfactory service. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in ground equipment, siting, or screening. (U)

AD-A057 122 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Engineering and Development Program Plan - Discrete Address Beacon System (DABS). (U)

MAY 78 43P
REPT. NO. FAA-ED-03-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, *Aerial reconnaissance, Electromagnetic compatibility, Radio beacons, Systems engineering, Automation, Data links, Communication and radio systems, Performance tests, Control systems, Computer programs (U)

The DABS development program consists of three major phases - System Design and Validation, Engineering Development, and Production Deployment. A single sensor design compatible with ATCRBS, including an integral data link, was realized. This effort resulted in developing engineering requirements for procurement of three industry built engineering model DABS sensors for further engineering development in the current phase of the program. This phase is system oriented, focusing on investigations of such problems as multiple sensor coordination, target hand-off, ARC interface and procedures, failure mode operation, ATARS(Formerly ipc) operation, etc. The experiments and tests will result in two technical data packages, one for single site and one for network operations for hand-off to the operational services for production implementation. This document addresses primarily the second phase of the DABS development program since deployment is dependent upon efforts related to the decision to implement DABS and the attendant transition planning. (U)

AD-A057 112 17/7 1/5 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Vortex Advisory System Simulation of Chicago O'Hare International Airport. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Jun 77,
JUL 78 26P Keeffe,Barry E. ;
REPT. NO. FAA-NA-78-12
MONITOR: FAA-RD 78-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Wake, *Trailing vortices, International airports, Warning systems, Aircraft landings, Approach, Glide slope, Glide path systems, Wind, Dissipation, Aviation safety, Digital simulation (U)
IDENTIFIERS: O'Hare International Airport (U)

This report evaluates, in simulation, the procedural implications of the Vortex Advisory System (VAS) on the Chicago O'Hare terminal air traffic control environment. It also attempts to demonstrate any cost benefits/capacity gains which may accrue using reduced VAS aircraft separation criteria on the final approach course based upon meteorological assurance of vortex dissipation. Utilizing the National Aviation Facilities Experimental Center (NAFEC) Digital Simulation Facility (DSF), a real-time simulation of the Chicago O'Hare International Airport airside operations was conducted between March 28 and June 24, 1977. There were 105 data runs of 1 hour and 20 minutes duration completed during this period. Test results indicate that (1) no procedural implications emerged which would deter the implementation of VAS at Chicago O'Hare Airport, and (2) arrival rate increases are sufficient to support previous cost/benefit analysis studies. (U)

AD-A057 059 17/7 1/5 12/1
MITRE CORP MCLEAN VA METREK DIV

Parameters of Future ATC Systems Relating to Airport Capacity/Delay. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 78 27P Haines,Andrew L. ;
REPT. NO. MTR-7766-REV-1
CONTRACT: DOT-FA78WA-4075
MONITOR: FAA-EM 78-8A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. FAA-EM-78-8 dated Apr 78, AD-A055 482.
DESCRIPTORS: *Air traffic control systems, *Airports, *Queueing theory, Delay, Scheduling, Aircraft landings, State of the art, Commercial aviation, Parameters, Case studies, Efficiency, Terminal flight facilities, Input output models, Arrival, Parametric analysis, Capacity(Quantity) (U)

The FAA, in conjunction with users of the major airports, is conducting a series of site specific case studies as to how to increase airport capacity--both now and in the future when the products of the FAA's Engineering and Development (E and D) Program have been implemented as part of the Operational ATC system. This document presents estimates of changes in longitudinal spacing on final approach that may be realized as the products of the E and D programs become available. It also discusses the potential for reducing interarrival errors and runway occupancy time. The parametric values presented are to be used by the FAA/User Group Airport Case Study Teams in assessing the potential impact of future airport/ATC changes on delay/capacity. Certain parameter values related to the estimation of present day delay/capacity are also presented. This paper provides minor changes from FAA-EM-78-8, April 1978, 'Parameters of Future ATC Systems Relating to Airport Capacity/Delay'. It supersedes FAA-EM-78-8. (Author) (U)

AD-A056 971 6/19 5/10 1/5
DEFENCE AND CIVIL INST OF ENVIRONMENTAL MEDICINE DOWNSVIEW (ONTARIO)

Instruments and Methodology for the Assessment of Physiological Cost of Performance in Stressful Continuous Operations - the Air Traffic Services Tower Environment. (U)

DESCRIPTIVE NOTE: Technical rept.,
APR 77 60P Soutendam,Jacques ;
REPT. NO. DCIEM-TR-77X53

UNCLASSIFIED REPORT

DESCRIPTORS: *Stress(Physiology), *Stress(Psychology), *Air traffic control systems, Air traffic controllers, Females, Males, Performance(Human), Man machine systems, Tolerances(Physiology), Toxic tolerances, Hypertension, Bioelectricity, Questionnaires, Air traffic control terminal areas, Canada (U)

A total of 39 females and males were used as subjects in a study designed to test the general validity and utility of methods and instruments of potential use in the determination of the physiological cost of work performance in stressful environments. A second goal of the study was to attempt a preliminary test of the hypothesis that a form of employment (Air Traffic Services) traditionally considered stressful, was significantly different from general forms of employment traditionally considered less stressful. To test this hypothesis 23 people employed as air traffic control tower personnel were slated as the experimental group and 16 subjects employed in an operationally oriented research facility served as the Control group. Within the parameters of this research design, consistent statistical significance was established when the entire sample was recategorized on the basis of subjective sleep adequacy assessment rather than by job description. Further research is indicated with well defined physiological categorization measures to obtain more definitive answers concerning job stress and physiological cost and the methodology development necessary to support general research efforts in this field. (Author) (U)

AD-A056 941 17/7
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

System Definition and Investigation of the On Site Processing of En Route Sensor Signals. Addendum - Investigation into Possible En Route On Site Beacon Ring Around Discriminants. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 78 179P Thomas,J. W. ;
REPT. NO. APL/JHU/FP2-E-034
CONTRACT: DOT-FA75WA-3553
MONITOR: FAA/RD,GIDEP 77/12-4,E105-2294

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Addendum to Rept. no. FAA-RD-77-12. See also Volume 1, AD-A038 491.
DESCRIPTORS: *Air traffic control systems, *False targets, Radar beacons, Sidelobes, Backlobes, Data processing, Signals, Discrimination, Statistical analysis, Computerized simulation (U)
IDENTIFIERS: Beacon ring around (U)

This report presents the results, conclusions and recommendations of an investigation to determine what, if any, characteristics exist in beacon reply data that could be used to identify false target reports generated by ring around. A specific technique, using run length, is suggested. The technique is evaluated via statistical methods and computer simulation. (Author) (U)

AD-A056 882 1/5 5/9
SRI INTERNATIONAL MENLO PARK CA

Cost Analysis of Electronic Tabular Display Subsystem. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 77 135P Couluris,George J. ;
Petracek,Stephen J. ;
CONTRACT: DOT-FA77WA-3911
MONITOR: FAA-AVP 77-31

UNCLASSIFIED REPORT

DESCRIPTORS: *Display systems, *Air traffic control systems, *Air traffic controllers, Computerized simulation, Recruiting, Maintenance, Sensitivity, Parametric analysis, Cost analysis, Productivity (U)
IDENTIFIERS: CAR(Controller Advance Recruitment), Workloads, Controller Advance Recruitment, Staffing costs, Tabular display subsystems, Training costs, LPN-SRI-5839 (U)

This report documents work performed by SRI International for the Federal Aviation Administration to study the potential cost-effectiveness of implementing Electronic Tabular Display Subsystems (ETABS) in the en route air traffic control system. ETABS is a device to electronically present flight data to air traffic controllers, and would automate certain control tasks. Cost comparisons are made for National Airspace System (NAS) Stage A system operations both with and without ETABS. Included for both operational systems are estimates of the present value of FAA expenditures during the fiscal years 1977 through 1999 for staffing, engineering and development, facilities and equipment, maintenance, and training; costs relating to delay, accidents, and the like are not included. Staffing costs, which account for the major portion of the total expenditures examined, represent wage costs for Air Traffic Service controller and support personnel and for Airway Facility Service personnel. Controller staffing includes full performance level and developmental personnel, with allowances for advance recruitment needs.

(U)

AD-A056 842 1/5 17/7
ROCKWELL INTERNATIONAL CEDAR RAPIDS IA COLLINS AVIONICS DIV

3D/4D Area Navigation System Design, Development and Implementation. Volume II. Support Data and Program Listings. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 77 244P Bruckner,Juergen M. H. ;
Benson,F. B. ;McCormick,Larry J. ;Sharpe, T. G. ;Hogle,Larry H. ;
CONTRACT: DOT-FA72WA-3123
MONITOR: FAA-RD 77-79-VOL-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Radio navigation, *Navigational aids, Direction finding, Range finding, Timing devices, Three dimensional, Flight testing, Errors (U)
IDENTIFIERS: Area navigation, Direct flights, Four dimensional, Airspace utilization, Spacing (U)

This volume presents the detailed support data for the 4D time control and localizer software definitions. Program listings for the final design are also presented. (Author) (U)

AD-A056 829 17/9
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

TRACALS Evaluation Report. Radar Station Evaluation Report, Aviano AB, Italy, 7-15 September, 5-9 December 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 78 89P Minsterl,James R. ;
REPT. NO. 77/68R-27

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Airport radar systems, Italy, Ground controlled approach radar, Air traffic control systems, Radar beacons, Approach indicators, Glide path systems, Search radar, Radar clutter, Test and evaluation (U)
IDENTIFIERS: AN/MPN-13C, AN/TPX-42A(V) (U)

This Traffic Control and Landing Systems (TRACALS) radar station evaluation report presents data to define the capabilities and limitations of the ground controlled approach (GCA) facility at Aviano AB, Italy. The GCA is comprised of an AN/MPN-13C airport surveillance radar (ASR) and precision approach radar (PAR) system, the AN/TPX-42A(V) type 1 air traffic control radar beacon system (ATCRBS), and the associated power systems. This report includes a description of useable ASR coverage, a description of the ATCRBS coverage and tracking capabilities, a description of PAR coverage and tracking capabilities, and the analysis of flight and equipment performance data. The capabilities and limitations presented are a guide for expected system performance until there is a modification to or relocation of the equipment or until a significant change occurs in the horizontal profile. (U)

AD-A056 699 1/5 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Radar Station Evaluation Report Clark AB, Republic of the Philippines, 14 February - 27 March 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 78 86P Chaumont,Roderick C. ;
REPT. NO. 78/66R-119

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Airports, Military facilities, Philippines, All weather aviation, IFF systems, Airport radar systems, Range(Distance), Resolution, Radar antennas, Antenna radiation patterns, Power supplies (U)
IDENTIFIERS: AN/FPN-47, AN/FPN-16, AN/TPX-42, TRACALS project (U)

This report presents data collected from 14 February - 27 March 1978 to define the capabilities and limitations of the radar approach control (RAPCON) facility at Clark Air Base, Republic of the Philippines. This report includes description of the useable ASR, PAR, and ATCRBS coverage and tracking capabilities, of all flight and equipment performance data, and the performance predictions for each system. The data presented can be used as a guide for anticipated equipment until there is an addition, deletion, or relocation of equipment or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A056 605 1/5 17/7
ROCKWELL INTERNATIONAL CEDAR RAPIDS IA COLLINS AVIONICS DIV

3D/4D Area Navigation System Design, Development, and Implementation. Volume 1. Main Text. (U)

DESCRIPTIVE NOTE: Final rept., JUN 77 94P Bruckner,Juergen M. H. ; Benson,Fred B. ;McCormick,Larry J. ;Sharpe, Tom G. ;
CONTRACT: DOT-FA72WA-3123
MONITOR: FAA-RD 77-79-VOL-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Navigational aids, *Radio navigation, Direction finding, Range finding, Errors, Timing devices, Three dimensional, Flight testing (U)
IDENTIFIERS: Area navigation, Airspace utilization, Direct flights, Four dimensional, Spacing (U)

This report summarizes the results of a study to design, develop, and implement a 3D/4D Area Navigation System for increasing aviation system capacity in the terminal area. Varying degrees of ATC and airborne system capability were assumed. The concepts developed are compatible with mixed airborne equipment capabilities. The 3D terminal area procedures should result in reduced ATC communications through the use of 3D STAR's for nominal profile definition. Reverse fans and base offsets are used for impromptu path modifications. Increased safety should result by maintaining navigation in the cockpit. The 4D procedures rely on a computer aided ATC metering and spacing system. The use of RNAV STAR's is expected to substantially improve the M and S algorithm development, controller interface design, and pilot tracking accuracies. The final avionics design has the capability for emulating two types of avionics equipments: one representing a minimum capability leg-at-a time, station referenced RNAV system and one representing a sophisticated route oriented, geographic referenced RNAV system. (U)

AD-A056 219 17/9 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, Ellsworth AFB, South Dakota, 27 March-4 April 1978. (U)

DESCRIPTIVE NOTE: Final rept., MAY 78 66P Mathews,Allen C. ;
REPT. NO. 78/66C-122

UNCLASSIFIED REPORT

DESCRIPTORS: *Ground controlled approach radar, *Air traffic control systems, *Airport radar systems, Instrument landings, Airport control towers, Line of sight, Antenna radiation patterns, Ultrahigh frequency, Radiofrequency interference, South Dakota, Test and evaluation (U)
IDENTIFIERS: Ellsworth Air Force Base, AN/FPN-47, AN/TPX-42, AN/FPN-16 (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Ellsworth AFB, South Dakota (2184 Comm Sq) from 27 March thru 4 April 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the radar approach control (RAPCON) and control tower. Included in this report are the results and analysis of equipment checks, system line-level diagrams, line-of-sight coverage data, analysis of airborne measurements of signal strength, and plots of UHF radiation patterns. Other items which are discussed in this report and are common problems with most other systems, include system alignment procedures, and antenna maintenance problems. The data and diagrams in this report can be used as a guide for anticipated performance of the communications system at Ellsworth AFB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would effect the system. This report will remain valid after relocation of the transmitter site. (Author) (U)

AD-A056 200C 1/5 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Dulles Control Tower Console Design Study. (U)

DESCRIPTIVE NOTE: Final rept. May 77-May 78,
JUN 78 46P Bradley,J. Roy , Jr;
REPT. NO. FAA-NA-78-30
MONITOR: FAA/RD 78/69

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport control towers, *Consoles, *Air traffic control terminal areas, Configuration management, Air traffic controllers, Modification, Air traffic control systems, Man machine systems, Performance(Human), Proficiency, Optimization, Display systems, Radar equipment (U)
IDENTIFIERS: Dulles International Airport, LPN-FAA-144-170-810 (U)

This report describes the development and testing effort directed toward providing a plan for inservice improvements to the operational quarters of Dulles International Airport Control Tower. Through the use of full-scale mockups, console designs and equipment arrangements were established, modified, and appraised. Opinions and recommendations of Air Traffic Specialists and Airway Facility Sector personnel from Dulles Tower were used as a basis for determining the advantages or disadvantages of particular equipments and their locations, console designs, and modifications. The results constitute a proposal for refurbishing the operation's quarters of Dulles Tower. Included are drawings for a new console along with a detailed plan for an improved position and equipment arrangement. (Author) (U)

AD-A056 180 17/7 1/5 5/9
STANFORD RESEARCH INST MENLO PARK CALIF

Atlanta Center Upgraded Third Generation Enroute ATC System Operations: A Case Study. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 77 157P Couluris,George J. ;Johnson, Jerome M. ;Procter,H. Steven ;
CONTRACT: DOT-FA75WA-3714
MONITOR: FAA-AVP 77-22

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air control centers, International airports, Flight paths, Scheduling, Air space, Air traffic control terminal areas, Air traffic controllers, Modification, Discrete address beacon systems, Data links, Collision avoidance, Computerized simulation, Systems analysis, Performance(Human) (U)
IDENTIFIERS: Atlanta International Airport, LPN-SRI-4416 (U)

This report documents the work performed to assess the impact of Upgraded Third Generation Enroute Air Traffic Control (ATC) System alternatives on control facility operations. The various enhancement features are considered to be added incrementally to the current National Airspace System (NAS) Stage A enroute ATC operation and include: automatic data handling, enroute metering, automated local flow control, conflict probe, area navigation, Discrete Address Beacon System (DABS) data link, and DABS-based intermittent positive control. Staffing estimates for each enhancement system are made for the Atlantic Air Route Traffic Control Center for the years 1980 through 2000, and include Air Traffic Service and Airway Facilities Service personnel. The estimation procedure uses models previously developed by SRI based on extensive observations of ATC operations. These models include the Relative Capacity Estimating Process (RECEP), which relates ATC sector controller workload requirements to traffic capacities, and the Air Traffic Flow (ATF) (U)

AD-A056 148 17/7 17/2 9/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Test and Evaluation of Air/Ground Communications Antennas. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Dec 77,
JUN 78 131P Coyle,James J. ;
REPT. NO. FAA-NA-77-39

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Antennas, Communication and radio systems, Ground stations, Very high frequency, Ultrahigh frequency, Dipole antennas, Discone antennas, Directional antennas, YAGI antennas, Broadband antennas, Omnidirectional antennas, Antenna radiation patterns, Off the shelf equipment (U)
IDENTIFIERS: LPN-FAA-062-221-100 (U)

This report presents data from the evaluation and analysis of a select group of very high frequency (VHF) and ultrahigh frequency (UHF) Air/Ground (A/G) communication antennas. Antenna patterns, gain, and voltage standing wave ratio measurements were made at the National Aviation Facilities Experimental Center (NAFEC) antenna range on both Federal Aviation Administration (FAA) specified and commercially available off-the-shelf antennas. These antenna data show that improved A/G communications coverage can be obtained with some of the commercially available antennas. (Author) (U)

AD-A056 053 6/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

The Morbidity Experience of Air Traffic Control Personnel, 1967-1977, (U)

APR 78 34P Booze,Charles F. ;
REPT. NO. FAA-AM-78-21

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Diseases, Morbidity, Health, Pathology, Hearing, Vision, Statistical data (U)

The morbidity experience of 28,086 air traffic controllers has been examined from 1967-77 with particular emphasis given the potential effects of job demands on ATC Health. The morbidity experience of air traffic controllers does not appear excessive when compared with the experience of other outside groups studied, except for psychoneurotic disorders. While some isolated trends found in these data are supportive of an occupation disease relationship, they are neither impressive nor consistent, as would be expected if the association were a strong one. Quantification of the substantial differences was found to exist in the incidence of disease before and after the second-career legislation. While job and salary protection considerations obviously explain some of the difference, the importance of examination and screening techniques, which are not as dependent on reliable medical history, are emphasized for both air traffic control personnel and the general airman population in an environment in which a major justification for the periodic health examination is the protection of individuals other than the examinee. (U)

AD-A055 938 17/7 5/9 1/5
STANFORD RESEARCH INST MENLO PARK CALIF

Oakland Bay TRACON and Los Angeles TRACON: Case Studies of Upgraded Third Generation Terminal ATC Operational Impact. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 77 218P Couluris,George J. ;Johnson, Jerome M. ;
CONTRACT: DOT-FA75WA-3714
MONITOR: FAA-AVP 77-23

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Control Systems, *Air traffic controllers, International airports, Systems analysis, Performance(Engineering), Performance(Human), Trade off analyses, Operations research, Discrete address beacon systems, Data links, Data processing, Conflict, Computerized simulation, Work measurement, Decision making, Voice communications, Mathematical models (U)
IDENTIFIERS: Los Angeles International Airport, Oakland International Airport, LPN-SRI-4416 (U)

This report documents the work performed by Stanford Research Institute (SRI) to assess the impact of Upgraded Third Generation (UG3RD) Terminal Air Traffic Control (ATC) System alternatives on control facility operations. The various UG3RD features would be added incrementally to the current Automated Radar Terminal (ARTS) III terminal ATC operation; the alternatives under evaluation are automatic data handling, basic metering and spacing (M and S), conflict probe, area navigation, Discrete Address Beacon System (DABS) data link (incorporating advanced M and S), and DABS-based intermittent positive control. (U)

AD-A055 529 1/4 1/5 1/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

IPC Design Validation and Flight Testing. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 78 268P Andrews,J. W. ;Koegler,J. C. ;Senne,K. D. ;
REPT. NO. ATC-85
CONTRACT: F19628-78-C-0002, DOT-FA72WAI-261
MONITOR: FAA-RD,GIDEP 77-150,E104-1818

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Air traffic control systems, *Aviation safety, Flight testing, Flight instruments, Algorithms, Performance(Human), Radar tracking, Validation, Data processing, Air traffic controllers (U)
IDENTIFIERS: ATARS(Automatic Traffic Advisory and Resolution Service), Automatic Traffic Advisory and Resolution Service, IPC(Intermittent Positive Control), Intermittent Positive Control, LPN-FAA-034-241-012 (U)

A series of flight tests were conducted to evaluate the collision avoidance system known as Intermittent Positive Control (subsequenty re-named Automatic Traffic Advisory and Resolution Service, ATARS). These tests involved both professional test pilots and subject pilots selected from the aviation community. This report includes analysis of the collision avoidance algorithm, pilot visual acquisition performance, and pilot reaction to avoidance instructions. (Author) (U)

AD-A055 090C 17/7 1/5 1/2 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

Communications Station Evaluation Report, Buckley ANGB, Colorado, 21-28 February 1978. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 78 67P Mathews,Allen C. ;
REPT. NO. 78/66C-120

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, *Aircraft landings, *Communication and radio systems, Test and evaluation, Aviation safety, Environmental tests, Signals, Instrument landings, Ground controlled approach radar, Ground support, Antennas, Maintenance, Test facilities, Terminal flight facilities (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Buckley ANGB, Colorado (1987 Comm Sq) from 21-28 February 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the ground controlled approach (GCA) and control tower. Included in this report are the results and analysis of equipment checks, system line level diagrams, line-of-sight coverage data, analysis of airborne measurements of signal strength, and plots of UHF and VHF radiation patterns. Other items which are discussed in this report and are common problems with most other systems, include system alignment procedures, and antenna maintenance problems. The data and diagrams in this report can be used as a guide for anticipated performance of the communication system at buckley ANGB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would effect the system. (Author) (U)

AD-A055 009 5/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

The Relationship of Predevelopmental '150' Training with Noncompetitively Selected Air Traffic Control Trainees to FAA Academy Success, (U)

MAR 78 25P Boone,James O. ;
REPT. NO. FAA-AM-78-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Training, *Air traffic controllers, Minorities, Females, Background, Teaching methods, Ratings, Analysis of variance (U)

Past studies have demonstrated that women and minorities are less likely to be selected as FAA air traffic controllers than are nonminority men, and, when selected, are less likely to be successful. One major reason for this is that women and minorities have less aviation-related background experience. In response to this need the '150' Predevelopmental program was begun to give those selected for the program a 1-year orientation to aviation and air traffic control prior to FAA Academy training. The purpose of this research was to study the unique relationship between Predevelopmental training and Academy success. An overview of the relationships between various background characteristics, selection measures, Predevelopmental training measures, and Academy measures was first computed. Then, through path analysis the significant relationships were considered simultaneously to determine the unique relationship between Predevelopmental training and Academy success. The path models indicated that Predevelopmental training overall does enhance a trainee's potential for Academy success with a possible differential effect according to minority status. (Author) (U)

AD-A054 897 17/9 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

Radar Station Evaluation Report, Williams AFB, Arizona, 16-25 January 1978. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept. (Final), APR 78 78P Pinnery,Earl T. ;
REPT. NO. 78/66R-115

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Airport radar systems, *Ground controlled approach radar, Air traffic controllers, IFF systems, Search radar, Radar beacons, Moving target indicators, Radar tracking, Test and evaluation, Arizona (U)
IDENTIFIERS: AN/GPN-12, AN/TPX-2, Williams Air Force Base (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 16-25 January 1978 to define the capabilities and limitations of the ground controlled approach (GCA) facility at Williams AFB, AZ. The GCA is composed of an AN/GPN-12 airport surveillance radar (ASR), AN/TPX-42A (V) Type III air traffic control radar beacon system (ATCRBS), AN/FPN-61 precision approach radar (PAR), and the associated power systems. This report includes descriptions of the useable ASR coverage and tracking capabilities, the useable ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR and ATCRBS systems. The data presented can be used as a guide for anticipated equipment performance until there is an addition, or relocation of equipment or until a change occurs in the horizontal profile. (Author) (U)

AD-A054 823 17/7 9/3 14/1
ARINC RESEARCH CORP ANNAPOLIS MD

Avionics Cost Development for Alternatives of Selected Air Traffic Control Systems. (U)

DESCRIPTIVE NOTE: Final rept., OCT 77 69P Kowalski,S. H. ;
REPT. NO. 1326-01-3-1758
CONTRACT: DOT-FA76WA-3788

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Avionics, *Cost analysis, Models, Modems, Transponders, Radio receivers (U)
IDENTIFIERS: Pricing models (U)

This report presents the results of the cost analysis of avionics required in support of the Upgraded Third Generation Air Traffic Control developments. The systems considered were recommended for evaluation by the Office of Systems Engineering Management of the FAA. The costs of avionics were developed with the aid of a pricing model to provide comparative evaluations based on uniform parametric data varying only in system-peculiar descriptors. (Author) (U)

AD-A054 604 9/3 9/5 1/5
IIT RESEARCH INST ANNAPOLIS MD

FAA Remote Terminal System. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 77 98P Hensler,Thomas ;
CONTRACT: F19628-78-C-0006, DOT-FA76WAI-612
PROJ: 649E
MONITOR: FAA-RD,ECAC 78-8,PR-77-067

UNCLASSIFIED REPORT

DESCRIPTORS: *Frequency allocation, *Remote terminals, *Air traffic control systems, Electromagnetic compatibility, Computer programs (U)
IDENTIFIERS: Interdepartment radio advisory committee, GMF(Government Master File), ACES(Adaption Controlled Environment System) (U)

A system of interactive analysis program was developed by the Electromagnetic Compatibility Analysis Center (ECAC) for the Federal Aviation Administration (FAA). This system provides automated, quick-response capabilities for use by the FAA frequency managers to solve daily frequency management problems. The system can be used to display records from the FAA Air Traffic Control (ATC) data base, provide electromagnetic compatibility (EMC) analyses, make frequency assignments, and plot service volumes. The typical program inputs and sample results are shown in the appendixes. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A054 510 17/7 5/9 1/3
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

An Evaluation of Modified RNAV Terminal Procedures Using a Single-Waypoint RNAV System. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Jun 76,
APR 78 120P Eldredge,Donald ;Goldberg, Bernard ;Crimbring,William ;
REPT. NO. FAA-NA-77-49
MONITOR: FAA-RD 78-27

UNCLASSIFIED REPORT

DESCRIPTORS: *Radio navigation, *Air traffic control systems, Flight simulators, Pilots, Performance(Human), Cockpits, Errors, Navigation computers, Flight paths, Routing, Tracking, Instrument panels, Man machine systems (U)

Nine pilots participated in a series of flight simulation tests employing solo pilot techniques which were conducted at the National Aviation Facilities Experimental Center (NAFEC) in order to measure Total System Crosstrack (TSCT) and Flight Technical Error (FTE) using a single-waypoint area navigation (RNAV) system. The tests were designed to assess pilot performance as a function of routes and route structures (consisting of different combinations of waypoints and/or intersections). Performance was measured on the variables: horizontal tracking and procedural performance. The horizontal tracking data included both steady state and transition data. (U)

AD-A054 474 17/7 5/1
MITRE CORP MCLEAN VA METREK DIV

Economic Analysis of Future Civil Air Navigation Systems. (U)

DESCRIPTIVE NOTE: Final rept. for CY 1977.
DEC 77 35P Joglekar,Anil N. ;Seiler, Karl , III;
CONTRACT: DOT-FA78WA-4075
MONITOR: FAA-EM 78-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Radio navigation, *Air traffic control systems, *Civil aviation, Domestic, Economic analysis, Planning, TACAN, LORAN Distance measuring equipment, Very high frequency, Omnidirectional, Global positioning system, Avionics, Cost estimates, Replacement (U)
IDENTIFIERS: VORTAC, LORAN C (U)

This report updates and consolidates the economic analyses of three previous FAA/METREK studies related to future domestic air navigation. Subsequent to the writing of one of these reports, which demonstrated the benefits of VORTAC modernization, the Airway Facilities Service (AAF) made significant revisions to both the F/E and O/M cost estimates for VORTAC modernization. The FAA also updated its estimate of distribution of VOR and DME among the general aviation population. This report documents the impact of these changes. There are no significant changes to both LORAN-C and GPS avionics cost estimates at this time. The study shows that there is no cost advantage in replacing the present VOR/DME system unless more stringent needs, such as area navigation, coverage and accuracy become necessary. Based on the estimated avionics costs the results show that the total cumulative costs (discounted at 10%) to the user plus government, for the various alternatives studied from the year 1985-2010, range from $695 million for VOR/DME, and $865 million for LORAN-C, to $970 million for GPS. It is further shown that if either LORAN or GPS ever become the primary air navigation system, (U)

AD-A054 245 17/7 1/5 1/2
MITRE CORP MCLEAN VA METREK DIV

Impact of FAA E and D Elements--Eight Airport Summary. Volume 8. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 78 71P Haines,A. L. ;
REPT. NO. MTR-7350-VOL-8
CONTRACT: DOT-FA78WA-4075
MONITOR: FAA-EM 78-4-VOL-8

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, Airports, Airport radar systems, Discrete address beacon systems, Microwave landing systems, Wake, Trailing vortices, Collision avoidance, Instrument landings, Air traffic controllers, Flight paths, Scheduling, Fuel consumption, Terminal flight facilities (U)

The potential benefits of implementing the products of selected FAA Engineering and Development Programs at eight major airports are surveyed. Best estimates of the expected performance of the Vortex Advisory/Wake Vortex Avoidance Systems (VAS/WVAS), Metering and Spacing (M and S--part of the ATC System Automation Program) and the Discrete Address Beacon System are used as basis for estimating the increase in airport capacity that might be realized from the collective use of those systems in a pre-1985 case and a post-1985 case. Best estimates of the expected performance of the Airport Surface Traffic Control (ASTC) system, the Microwave Landing System (MLS), and Area Navigation Equipment (RNAV) plus results of recent FAA/TSC studies are used as the basis for estimating the individual impacts of those systems on controller workload, changes in air routes to reduce time and fuel, and ILS interference problems at the eight airports. This report summarizes the potential benefits. (Author) (U)

AD-A054 244 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. TACAN, VOR, and ILS Station Evaluation Report, Andersen AFB, Guam, 25 July - 15 August 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 78 253P Nix,Paul W. ;
REPT. NO. 77/66N-107

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Instrument landings, *Ground stations, *TACAN, Test and evaluation, Very high frequency, Omnidirectional (U)
IDENTIFIERS: VOR, AN/GRN-19A, AN/FRN-38 (U)

This evaluation report presents data collected and analyzes capabilities and limitations of the Andersen AFB TACAN (AN/GRN-19A), VOR (AN/FRN-38), ILS (AN/MRN-7A/8A) and their associated power systems. The evaluation was conducted from 25 July to 15 August 1977. The results of the evaluation indicates that all the facilities are capable of providing satisfactory service. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in ground equipment, siting or screening. (Author) (U)

AD-A053 938 17/7 1/2 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, Little Rock AFB, Arkansas. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 78 55P Mason,Kenneth G. ;
REPT. NO. 78/66C-116

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Ground controlled approach radar, Landing fields, Radio receivers, Radio transmitters, Ultrahigh frequency, Very high frequency, Line of sight, Airborne (U)
IDENTIFIERS: Rivet Switch project, Little Rock Air Force Base, Control towers, AN/MPN-14, AN/GRT-22, AN/GRR-24 (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at Little Rock AFB, Arkansas (2151 Comm Sq) from 17-27 January 1978. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the ground control approach (GCA) and control tower. Included in this report are the results and analysis of equipment checks, system line level diagrams, line-of-sight coverage, data analysis of airborne measurements of signal strength, and plots of UHF and VHF radiations patterns. Other items which are discussed in this report, and are common problems with most other systems, include system alignment procedures and antenna maintenance problems. The data and diagrams used in this report can be used as a guide for anticipated performance of the communication system at Little Rock AFB until there is a deletion, addition, relocation of equipment, or a change in horizon profile which would affect the system. (Author) (U)

AD-A053 675 5/9 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Use of the Occupational Knowledge Test to Assign Extra Credit in Selection of Air Traffic Controllers, (U)

FEB 78 13P Lewis,Mary A. ;
REPT. NO. FAA-AM-78-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Personnel selection, Skills, Achievement tests, Job training, Jobs, Personnel management, Validation, Aptitude tests, Performance(Human) (U)

The Occupational Knowledge Test (OKT) 101-B was administered to 784 air traffic control trainees who entered the FAA Academy's 16-week training course in 1976. All trainees completed the nonradar laboratory portion of the training and in addition completed a preemployment questionnaire. Based on responses to the questionnaire, the trainees were assigned to one of three experience groups corresponding to groups given credit for experience using Civil Service Commission (CSC) selection procedures. It was found that the OKT was highly correlated with experience (r = .64) and in addition the OKT had a higher correlation with successful completion of the nonradar lab than did experience (r = .25 vs. .12). It was determined that use of an OKT score of 75 or above to assign extra credit would result in a failure rate of 3.1 percent for those receiving credit, while use of the current experience scale would result in a failure rate of 7.6 percent for those receiving extra credit on the CSC selection battery. The results held up a cross-validation sample of 432 trainees who entered the Academy during 1977. Based on the results, it is recommended that an OKT score of 75 or above be used to assign extra credit for experience in the selection of air traffic controllers. (Author) (U)

AD-A053 674 5/10 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

A Comparison of the Vigilance Performance of Men and Women Using a Simulated Radar Task, (U)

MAR 78 12P Thackray,Richard S. ;
Touchstone,R. Mark ;Bailey,J. Powell ;
REPT. NO. FAA-AM-78-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Vigilance, *Air traffic controllers, Males, Females, Performance(Human), Attention, Monitoring, Radar operators, Mental ability, Fatigue(Physiology), Alphanumeric displays, Students (U)
IDENTIFIERS: Sex differences (U)

The present study examined the question of possible sex differences in the ability to sustain attention to a complex monitoring task requiring only a detection response to critical stimulus changes. The visual display was designed to approximate a futuristic, highly automated air traffic control radar display containing computer-generated alphanumeric symbols. Twenty-six men and an equal number of women were each tested over a 2-hour session. Sixteen targets appeared on the screen at all times, with 10 signals (a designated change in the alphanumerics) randomly presented during each half hour of the test session. Detection latency to the signals increased significantly during the session, but there was no evidence of any significant difference between the sexes in the magnitude or pattern of this increase. The results are discussed in terms of a general decline in alertness that was apparently equal for both sexes. (Author) (U)

AD-A053 354 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. TVOR Special Evaluation Report Arnold AFS, Tennessee, 11-17 December 1977. (U)

DESCRIPTIVE NOTE: Final rept., MAR 78 62P Clark,Allen D. ;
REPT. NO. 77/66S-113

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, Test and evaluation, Errors (U)
IDENTIFIERS: TVOR evaluation, AN/FRN-31 (U)

This report presents the results of the 11-17 December 1977 special TRACALS evaluation of the Arnold AFS, Tennessee, AN/FRN-31 TVOR. The evaluation was directed towards investigating the cause and possible cures for noted deficiencies in the usable coverage, course structure, and course alignment. During the evaluation all major objectives were met and the TVOR was returned to unrestricted service. Recommendations are made for further improvements. The results presented in this report can be used as a guide to anticipate facility performance until there is a significant change in either ground equipment or siting environment. (Author) (U)

AD-A053 353 17/7 1/5 17/2.1 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report Castle AFB, California, 7-17 November 1977. (U)

DESCRIPTIVE NOTE: Final rept., MAR 78 71P Mason,Kenneth G. ;
REPT. NO. 76/66-C-72

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Control Systems, *Landing aids, *Communication and radio systems, Test and evaluation, Airport radar systems, Ultrahigh frequency, Very high frequency, Area coverage, Approach (U)
IDENTIFIERS: Rivet switch, Radar approach control (U)

A Traffic Control and Landing System (TRACALS) Communications Station Evaluation was performed at Castle AFB, California (2035 Comm Sq) from 7-17 November 1977. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the Radar Approach Control (RAPCON) and control tower. Included in this report are the results and analysis of equipment checks, system line level diagrams, line-of-sight coverage data, analysis of airborne measurements of signal strength, and plots of UHF and VHF radiations patterns. Other items which are discussed in this report, and are common problems with most other systems, include system alignment procedures, receiver audio output and squelch settings, receiver coupler loss, and antenna maintenance problems. The data and diagrams used in this report can be used as a guide for anticipated performance of the communication system at Castle AFB until there is a deletion, replacement, relocation of equipment, or a change in horizon profile which would affect the system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A053 001 17/7 17/9 17/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Communications Station Evaluation Report, Mountain Home AFB, Idaho. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 78 83P Buford,Jimmy D. ;
REPT. NO. 77/66C-105

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, *Airport radar systems, *Communication equipment, Ultrahigh frequency, Very high frequency, Test and evaluation (U)

A Traffic Control and landing Systems (TRACALS) Communications Station Evaluation was performed at Mountain Home AFB, ID (2036 Comm Sq) from 14-25 July 1977. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the Radar APproach Control (RAPCON) and control tower. Included in this report are the results and analysis of equipment checks, system line level diagrams, line of sight coverage data, analysis of airborne measurements of signal strength, and plots of UHF and VHF radiation patterns. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications system at Mountain Home AFB until there is an addition, deletion, relocation of equipment, or a change in horizon profile which would affect the system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A052 832 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TACAN and TVOR Station Evaluation Report, Westover AFB, MA, 9-19 August 1977. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept. (Final),
FEB 78 87P Barnhart,Kathryn Y. ;
REPT. NO. 77/66N-108

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *TACAN, *Radio stations, Very high frequency, Omnidirectional, Sites, Test and evaluation (U)
IDENTIFIERS: TRACALS, TVOR station, AN/GRN-20B, Radar screening (U)

This report presents the results of the 9-19 August 1977 TRACALS evaluation of the Westover AFB, AN/FRN-31 TVOR and AN/GRN-20B TACAN and their associated power systems. The evaluation was conducted to observe the facilities in their installed environment and to determine their capabilities and limitations. Results show that the facilities are capable of satisfying the users requirement; however, recommendations are made for improvements. The results obtained can be used as a guide to anticipated performance until there is a significant change in either ground equipment, siting, or screening. (Author) (U)

AD-A052 819 17/2 9/2 17/7
PURDUE UNIV LAFAYETTE IND SCHOOL OF ELECTRICAL ENGINEERING

Microprocessor-Controlled Communications in Air Terminal Navigation Systems. (U)

DESCRIPTIVE NOTE: Final rept. 1 Nov 75-31 Dec 77, JAN 78 182P Belter,Stephen E. ;Williams, Craig R. ;Bass,Steven C. ;
CONTRACT: DOT-FA-74WA-3518
MONITOR: FAA-RD 78-25

UNCLASSIFIED REPORT

DESCRIPTORS: *Computer communications, *Air traffic control systems, *Instrument landings, Microcomputers, Lightning, Protection, Noise reduction (U)
IDENTIFIERS: Tone signalling (U)

This report documents the implementation of some old and new techniques to the problem of command-and-control signaling within a Category III instrument landing system. The old techniques include the use of tone signaling over balanced lines, along with isolation transformers and gas-discharge elements for lightning protection. The new methods include the application of microprocessor control devices to supervise, format, and interpret all communications. Additional features afforded by the microprocessor approach include automatic and manual maintenance logging at the control tower, more reliable transmission error detection, enhanced system status displays, and a self-contained operator training feature. (Author) (U)

AD-A052 808 1/2 17/7 17/2
SRI INTERNATIONAL ARLINGTON VA

Forecast and Analysis of International Air Traffic in Relation to Transoceanic Communication Requirements. Appendix II. (U)

DESCRIPTIVE NOTE: Summary rept., DEC 77 99P Pozdena,Randall ;Gross, Dorothea ;Gorham,James ;Yee,Dennis ;
CONTRACT: DOT-FA75WA-3574
MONITOR: FAA-RD 77/131-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Appendix 1, AD-A052 804.
DESCRIPTORS: *Air traffic, *International airports, *Air traffic control systems, Flight paths, Air transportation, Requirements, Forecasting, Global communication systems, Market research, Routing, Scheduling, Cost analysis, Mathematical models, Statistical analysis (U)
IDENTIFIERS: LPN-SRI-MSU-4004 (U)

This appendix presents a more extensive description of the methodology and assumptions used in developing the SRI air traffic activity forecasting system. Specifically, it describes assumptions concerning the future market environment of aviation, the forecasting system developed to estimate levels of air traffic and derive peak instantaneous airborne counts, and the results of tests conducted to assess the effects of changing parameter assumptions on the forecast results. (Author) (U)

AD-A052 772 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Las Vegas Graphic Study. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 78 130P Maurer,John J. ;Misiewicz, Victor J. ;Tack,Robert W. ;
REPT. NO. FAA-NA-77-27
MONITOR: FAA-RD 77-182

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, International airports, Air Force facilities, Air traffic controllers, Questionnaires, Management planning and control, Systems analysis, Systems management, Operational effectiveness, Selection, Graphics, Statistical analysis, Ratings (U)
IDENTIFIERS: Las Vegas(Nevada), Nellis Air Force Base, McCarran International Airport, LPN-FAA-218-152-800 (U)

A graphic study was conducted by the National Aviation Facilities Experimental Center (NAFEC) to develop and evaluate a number of new procedural plans for the control of air traffic operating within the Las Vegas terminal area. A plan was also developed for a 'head-on' type departure/arrival operation for Nellis Air Force Base (AFB). A controller opinion questionnaire was developed around factors that comprise elements of air traffic control that take into consideration the users, controllers, and the area. Each plan was evaluated by a panel of 14 air traffic control specialists. The new plans for the terminal area, along with the present operating procedures, were evaluated for each of four directions of operation or runway configurations and then statistically compared with each other. The 'head-on' plan for Nellis AFB was likewise evaluated, and results from the questionnaires statistically compared with present operating procedures at Nellis AFB. The results of the evaluation indicate that, overall, plans 1 and 2 were significantly preferred over the present system (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A052 664 17/9 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Radar Station Evaluation Report, Scott AFB, Illinois, 77/66R-111, 17-28 October 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 78 72P Chaumont,Roderick C. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Availability: Document partially illegible.
DESCRIPTORS: *Radar stations, *Air traffic control systems, *Landing aids, Radar beacons, Test and evaluation, Airport radar systems, Area coverage (U)
IDENTIFIERS: AN/FPN-47 (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the radar approach control (RAPCON) facility at Scott AFB, Illinois. The data presented in this report were collected during the evaluation period 17-28 October 1977. Units evaluated were the AN/FPN-47 airport surveillance radar (ASR), AN/TPX-42A(V) Type III air traffic control radar beacon system (ATCRBS), and associated power systems. This report includes descriptions of the useable radar coverage, radar coverage diagrams, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR and ATCRBS systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

AD-A052 546 17/2.1 22/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Satellite Communications Mode Simulation Tests for Oceanic Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Nov 76,
MAR 78 62P Jefferson,Francis W. ;
REPT. NO. FAA-NA-77-37
MONITOR: FAA/RD 77/167

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication satellites, *Air traffic control systems, Data transmission systems, Simulation, Voice communications, Access, Channels (U)
IDENTIFIERS: Access control, LPN-FAA-171-252-200 (U)

Tests of simulated satellite system configurations and channel access control were conducted with air traffic control (ATC) test subjects to determine controller reaction to the satellite mode of communications and their interaction with associated input/output interfaces. The tests were designed to simulate an oceanic ATC environment supported by satellite communications and surveillance. Traffic scenarios were simulated through use of prepared flight plans and communications scripts and use of a simulated aircraft terminal. Communications delays were introduced into the tests to approximate those delays that may be encountered during actual satellite-supported ATC operations. Data were acquired for the controller test subjects reaction to different voice and data communications delay/restriction situations, voice channel queuing, data communications message length and format constraints, acceptance of required communications disciplines, and the mix of voice and data communications when there was a choice between the two methods of communication. Results were: (1) Controller test subjects favored using data communications to accomplish routine controller-to-pilot communications transactions and voice communication to resolve difficult traffic control situations. (U)

AD-A052 403 1/2 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF MANAGEMENT SYSTEMS

FAA Air Traffic Activity, Fiscal Year 1977, (U)

SEP 77 237P Wilson,Patricia ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 30 Jun 76, AD-A032 260.
DESCRIPTORS: *Air traffic, *Air traffic control terminal areas, *Airports, Aircraft landings, Takeoff, Commercial aviation, Military aircraft, Overflight, Flight paths, Glide slope, Instrument flight, Instrument landings, Airport control towers, Routing (U)

This report furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service Stations (FSSs), Combined Station Towers (CS/Ts), International Flight Service Stations (IFSSs), and Approach Control Facilities. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A052 363 17/2.1 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPME.. SERVICE

Discrete Address Beacon System (DABS) Development Test and Evaluation (DT and E) Program. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 77 31P Wojciech,John J. ;
REPT. NO. FAA/RD-77/185

UNCLASSIFIED REPORT

DESCRIPTORS: *Radio beacons, *Air traffic control systems, Test and evaluation, Data links, Performance(Engineering) (U)
IDENTIFIERS: DABS(Discrete Address Beacon System), LPN-FAA-034-241 (U)

The program to accomplish the Development Test and Evaluation (DT and E) of the Discrete Address Beacon System (DABS) is defined. The goals of the DABS (DT and E) Program are to establish the DABS performance characteristics, determine the compatibility of DABS with the Air Traffic Control (ATC) system, and demonstrate the ATC performance improvements made possible by DABS. In addition, an evaluation of the Automatic Traffic Advisory and Resolution Service (ATARS) and the use of the DABS data link to exchange pilot-ATC information will be performed. The evaluations of the DABS test results will be used to prepare technical data packages for DABS procurement by the Operating Services. The DABS (DT and E) Program consists of four phases: factory acceptance tests, field acceptance tests, performance tests, and DABS/ATC systems tests. General information is provided on the test requirements associated with each program phase, documentation requirements, organizational responsibilities, and schedules. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A052 362 1/5 17/9 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Airport Surface Detection Equipment (ASDE-3) Project Plan. (U)

DESCRIPTIVE NOTE: Rept. for FY 1978-1979,
JAN 78 49P Perie,M. E. ;
REPT. NO. FAA/RD-78/12

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Air traffic control systems, Display systems, Surfaces, Airports, Models, Detection (U)
IDENTIFIERS: Airport surface traffic control, ASDE(Airport Surface Detection Equipment) (U)

The Airport Surface Detection Equipment (ASDE) is a primary radar and display system used to provide the airport surface traffic situation to the air traffic controller. An ASDE-3 engineering model is being procured by the Transportation Systems Center (TSC) for testing at NAFEC. The product of this development will be a complete and comprehensive technical data package presented to the Airways Facilities Service (AAF) for procurement of production ASDE-3 units. The purpose of this Project Plan is to describe the program for development, test, evaluation, maintenance, and configuration control of the ASDE-3 engineering model, and to delineate the responsibilities of each of the participating organizations. (Author) (U)

AD-A052 342 14/2 17/7 17/9
NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA

Perspective Radar Display System. TV-Like Presentation on CRT Provides Higher Lateral Position and Lateral Motion Sensitivity than . PPI. (U)

DESCRIPTIVE NOTE: Technical rept. Mar-Dec 77,
JAN 78 21P Harris,L. G. ;
REPT. NO. NOSC/TR-198
PROJ: S0181 AA
TASK: S0181

UNCLASSIFIED REPORT

DESCRIPTORS: *Television display systems, *Air traffic control systems, *Radar tracking, Spatial distribution, High resolution, Comparison, Plan position indicators, Cathode ray tube screens, Antenna configurations, Electronic scanners, Rasters, Transformations, Performance(Human), Air traffic controllers (U)
IDENTIFIERS: PE63516N, WU823CC21 (U)

The data rate and display format of a conventional navigation radar/PPI display are adequate for most purposes but have limitations in certain close-range applications such as precision maneuvers in low-visibility conditions. At close ranges the PPI format bunches the close targets near the center of the scope where the inherent azimuth resolution is poorest. Close targets may make several degrees of change in relative bearing before the change is noticeable on the PPI display. Also, a small change in heading of own ship is not immediately apparent on a PPI display. Radar Systems Company has developed a Perspective Radar Display System which provides a perspective presentation on a cath de ray tube of the volume of space being scanned by an electromechanical scanning (nonrotating) radar antenna. This type of display has higher lateral position and lateral motion sensitivity than a PPI display. It has the additional capability of varying the apparent altitude of perspective. This report covers a technical and operational evaluation of the Perspective Radar Display System to determine its effectiveness as an aid to piloting; (U)

AD-A052 001 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Master Plan: Flight Service Station Automation Program. (U)

JAN 78 83P
REPT. NO. FAA/RD-FSS-01A

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Automation, Facilities, Site selection, Navigational aids, Communication terminals, Weather stations, Manpower utilization, Cost effectiveness, Maintenance, Planning, Long range(Time), Cost estimates (U)
IDENTIFIERS: Flight service stations (U)

The Master Plan for the Flight Service Automation Program is a planning document for the implementation of the Flight Service Information System and serves as the acquisition authorization document. This document contains background and introductory information relating to the present system of 292 manned domestic Flight Service Stations, program objectives, requirements, planning guidelines, systems and system interface descriptions, scheduling and implementation information, relationships with other major programs, management method, logistics, staffing, training, security, and financial planning information. (Author) (U)

AD-A051 876 17/7 1/5 9/3 15/5
ARINC RESEARCH CORP ANNAPOLIS MD

Adaptability of Airline-Type Avionics Acquisition Processes to Advanced Landing System Procurement. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 74 147P Schulz,W. ;Burgess,M. ;
Boring,G. ;Nicholson,J. ;
REPT. NO. 1054-01-1-1329
CONTRACT: F09603-73-A-4392

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, *Avionics, Commercial equipment, Commercial aviation, Air Force procurement, Cost effectiveness, Feasibility studies (U)

ARINC Research Corporation evaluated the feasibility and potential cost benefits of developing and applying ARINC Characteristic-type TRACALS specifications for a future Advanced Landing System (ALS) avionics procurement. This report presents the results of the evaluation; it describes the commercial air carriers' procurement process and the role of the Characteristic, comparing elements of military procurement with parallel elements of commercial procurement. Performance characteristics of military and commercial equipments are evaluated, and cost and reliability comparisons are made on the basis of available data. Problem areas associated with military use of the commercial process are also discussed, with emphasis on equipment-installation problems. Finally, a recommended approach to developing an ALS Characteristic is presented. (Author) (U)

AD-A051 690 6/5 6/19
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Development of the Aviation Stress Protocol--Simulation and Performance, Physiological, and Biochemical Monitoring Systems: Phase I. Assessment of Cardiovascular Function after Exposure to the Aviation Stress Protocol-Simulation. The Relationship between Stress-Related Metabolites and Disqualifying Pathology in Air Traffic Control Personnel, (U)

FEB 78 36P Higgins,E. A. ;Lategola,M. T. ;Melton,C. E. ;
REPT. NO. FAA-AM-78-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Three reports Relevant to Stress in Aviation Personnel.
DESCRIPTORS: *Aviation medicine, *Pilots, *Air traffic controllers, *Stress(Physiology), Monitoring, Cardiovascular system, Biochemistry, Altitude chambers, Flight simulation (U)
IDENTIFIERS: Aviation stress protocol simulation (U)

In development of the aviation stress protocol--simulation (ASPS), the following conclusions were reached: (1) In experiments using the ASPS, cardiovascular testing will be conducted in parallel, but separately; (2) The time of exposure to altitude will be limited to 2 h; and (3) Measurements such as visual accommodation, internal body temperature, blood glucose, blood drug or alcohol level, and others will be included in the ASPS only when appropriate. Cardiovascular and pulmonary parameters were assessed under simulated + Gz and exercise conditions in normal males after exposure to the ASPS. Some parameters were displaced to a statistically significant degree, but such displacements are of doubtful physiological significance because of the unavoidable time lapse between altitude exposure and assessment. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A051 669 17/7 1/5 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Communications Station Evaluation Report, Ramstein AB, Germany (6-16 July 77). (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 77 108P Minsterl,James R. ;
REPT. NO. 77/68C-23

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, *Radio stations, Test and evaluation, West Germany, Air Force facilities, Very high frequency, Ultrahigh frequency, Antenna radiation patterns, Line of sight (U)
IDENTIFIERS: TRACALS (U)

A Traffic Control and Landing Systems (TRACALS) Communication Station Evaluation was performed at Ramstein AB, Germany (1964 Comm Gp), 6-16 July 1977. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications system. Included in this report are results and analysis of equipment checks, single line audio level diagrams for the RAPCON and control tower systems, radio line-of-sight coverage data and analysis of airborne measurements. The data and diagrams presented in this report can be used as a guide for anticipated system performance until there is an addition, deletion, relocation of equipment, or a change in the horizon profile which would affect the system. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A051 621 17/9 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Project Plan: Tower Automated Ground Surveillance System Development Program, (U)

JAN 78 18P Perie,M. E. ;
REPT. NO. FAA-RD-78-4

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport control towers, *Surveillance, *Airport radar systems, *Air traffic control systems, Automation, Air traffic controllers, Ground level (U)
IDENTIFIERS: TAGS(Tower Automated Ground Surveillance System) (U)

The Tower Automated Ground Surveillance System (TAGS) represents an important step in providing automation support for air traffic controllers in the tower cab. During FY-1978 the objective of the TAGS activity is to perform the necessary analyses and feasibility tests to define the TAGS development program. This mini-plan describes the FY-1978 activity. (Author) (U)

AD-A051 513 17/7 1/5 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Performance Predictions for Proposed ILS Facilities at St. Louis Municipal Airport. (U)

DESCRIPTIVE NOTE: Final rept. May 75-Jun 77,
JAN 78 36P Jordan,L. ;Morin,S. ;
Stone,R. ;Hull,J. ;
REPT. NO. TSC-FAA-77-22
MONITOR: FAA/RD 78/1

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Air traffic control terminal areas, Airport radar systems, Glide path systems, Glide slope, Runways, Computerized simulation, Operational effectiveness, Mathematical prediction, Buildings, Terrain, Electromagnetic scattering, Performance(Engineering), Systems analysis (U)
IDENTIFIERS: Saint Louis Airport (U)

The results of computer simulations of performance of proposed ILS facilities on Runway 12L/30R at St. Louis Municipal Airport (Lambert Field) are reported. These simulations indicate that an existing industrial complex located near the runway is compatible with acceptable performance of the proposed facilities. Strict adherence to FAA standards for site grading is suggested to insure satisfactory performance of the glide slope systems. (Author) (U)

AD-A051 174 1/2 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Feasibility Study for Simulation of an Airport Tower Control Environment. (U)

DESCRIPTIVE NOTE: Final rept. May 76-Mar 77,
FEB 78 85P Hamilton,Helen W. ;
REPT. NO. FAA-NA-77-33
MONITOR: FAA-RD 77-190

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport control towers, Simulation, Air traffic control terminal areas, Air traffic controllers, Feasibility studies, Simulators, Training devices, Computer aided design, Computer aided instruction, Flight simulators, Ship bridges, Ship motion, Fog, Visibility (U)
IDENTIFIERS: LPN-FAA-151-461-090 (U)

The feasibility and desirability of developing an airport tower control simulation training facility at the FAA Academy was investigated. Training program needs were assessed, and the state-of-the-art in simulation technology was surveyed. Several large-scale airport tower and ship's bridge simulators are described and evaluated from an operational and engineering viewpoint; also, a number of flight simulators and image generation and projection systems are considered with regard to the applicability of the concepts to the FAA training requirements. Computer-generated image systems versus other imaging technologies are discussed with reference to realism requirements, capability for efficient generation of instructional materials, and for objective student evaluation. The large number of visual-scene simulation facilities presently in use or under contract development for a wide variety of uses indicates that a tower control application is entirely feasible. (Author) (U)

AD-A051 148 17/7 17/9
BENDIX CORP BALTIMORE MD COMMUNICATIONS DIV

Design, Fabrication, and Testing of Brassboard Model ATCRBS Based Surface Trilateration Data Acquisition Subsystem. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Dec 75, DEC 77 40P Brockway,A. L. ;Kuhl,J. B. ;Woodall,P. J. ;
REPT. NO. BENDIX-489A10A
CONTRACT: DOT-TSC-769
MONITOR: FAA-RD,TSC 77-174,FAA-77-26

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Airport radar systems, Brassboard models, Data acquisition, Field tests, Transponders, Surveillance (U)

Field-test results are emphasized in this report which also contains background information on airport surface traffic control (ASTC) and the contract objectives. The field-test series proved the technical feasibility of an air traffic control radar beacon system (ATCRBS) based ASTC sensor system. Operational data acquisition subsystem (DAS) performance projections developed to date as a result of the test series are presented, and a recommendation for pursuit of further testing is substantiated. (Author) (U)

AD-A051 130 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Air Traffic Separation Studies: An Annotated Listing of Reading Materials. (U)

DESCRIPTIVE NOTE: Final rept. 1955-1976, JAN 78 118P Bradbury,Paul W. ;
REPT. NO. FAA-NA-77-15
MONITOR: FAA-EM 77-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Bibliographies, Separation, Collisions, Mathematical models, Risk, Aviation safety, Collision avoidance, Probability (U)
IDENTIFIERS: Air traffic separation (U)

This bibliographic compilation lists reading materials concerned with separation standards for the air traffic control system. Related subjects, such as collision risk analysis, navigational track-keeping error, descriptions of proposed navigational systems or aids, and cost/benefits trade-off studies of ATC system design, are included to some extent, but selectively rather than extensively or in depth. Orientation of the materials selected for listing is largely, but not exclusively, toward oceanic enroute aspects of the international air traffic control systems. The North Atlantic system (NAT) is particularly evident; this follows naturally from the extensive study efforts organized under ICAO as the NAT Systems Planning Group and the special panel for 'Review of the General Concept of Separation (RGSCP).' The style of presentation is tailored to facilitate rapid scan. Annotations are largely derivative from other sources, and the comments are descriptive rather than evaluatory. Comprehensiveness was sacrificed to selectivity to avoid unwieldness. (Author) (U)

AD-A051 128 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Verification of DABS Sensor Surveillance Performance (ATCRBS Mode) at Typical ASR Sites Throughout CONUS. (U)

DESCRIPTIVE NOTE: Project rept.,
DEC 77 52P Wells,W. I. ;
REPT. NO. ATC-79
CONTRACT: F19628-78-C-0002, DOT-FA72WAI-261
MONITOR: FAA/RD 77/113

UNCLASSIFIED REPORT

DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, Test and evaluation, Radar beacons, Accuracy, Range(Distance), Azimuth, Field conditions, Performance(Engineering), Site selection, Test methods, Monopulse radar, Radar clutter, Errors (U)
IDENTIFIERS: LPN-FAA-034-241-012, Radar ghosts (U)

A Transportable Measurement Facility (TMF) incorporating antenna, r-f, and reply processing elements of a Discrete Address Beacon System (DABS) sensor has been sited at, and in the vicinity of, several FAA terminal ASR's throughout the United States. Data collected at these sites have been thoroughly analyzed to verify the design of the DABS sensor and to establish the need for design refinements. This report presents the results that pertain to DABS and ATCRBS Mode range and azimuth accuracy and to the total ATCRBS Mode reply processing performance. It is shown that both range and azimuth accuracies for the DABS sensor are a factor of four to five better than those provided by existing ARTS (BI-4) interrogators, and that the average blip/scan ratio is 98% or better, dropping only a few percentage points in crossing track situations. (Author) (U)

AD-A051 064 5/8 17/7 5/5 5/9
SRI INTERNATIONAL MENLO PARK CA

Policy Impacts of ATC Automation: Human Factors Considerations. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 78 144P Couluris,G. J. ;Tashker,M. G. ;Penick,M. C. ;
CONTRACT: DOT-FA76WAI-635
MONITOR: FAA-AVP 78-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Payne-Maxie Consultants, Berkeley, CA.
DESCRIPTORS: *Human factors engineering, *Air traffic controllers, *Man machine systems, *Automation, Policies, Planning, Systems management, Decision making, Emergencies, Air traffic control systems, Job satisfaction, Motivation, Man computer interface (U)
IDENTIFIERS: Federal Aviation Agency, LPN-SRI-PHU-5719 (U)

This report examines the future policy impact implications of advanced air traffic control (ATC) systems which might be developed by the Federal Aviation Administration (FAA). It studies impacts of ATC automation on sector air traffic controllers, with emphasis placed on the identification of human factors problems that may arise in the future if higher levels of automation are implemented. Of particular concern are those human factors that may in some manner determine the direction of automation development or impeded the implementation of automation. Using descriptions of technological components currently proposed by the FAA, six ATC system operations were defined. These systems represent various levels of automation development from the current system to a system in which the human controller acts as a systems data manager. The systems were evaluated in terms of 17 factors describing job satisfaction and motivation, man-machine interface, and failure mode operations in order to identify critical operational characteristics for each system. (U)

AD-A050 960 1/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Summary of Airline Delay Trends 1972-1975. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 77 61P Condell,Helen ;Horowitz, Seymour R. ;
REPT. NO. TSC-FAA-77-6-F
MONITOR: FAA-EM 77-12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A039 483.
DESCRIPTORS: *Commercial aviation, *Air traffic control systems, Delay, Scheduling, Time, Arrival, Flight paths, Airports, Data bases, Statistical data, Data acquisition, Data reduction (U)

This document is a highlight edition of the Annual Airline Delay Trends Report published since 1974. These reports provide estimates of block, airborne, and ground delays for approximately 325 route segments connecting 20 of the most active U.S. airports, and serviced by 19 major domestic scheduled air carriers. Delay information as presented in this summary edition consists of airborne and ground data for each of the 20 airports in the study, displayed in both table and graph form, for the years 1972 through 1975 for the following categories: (1) Total traffic activity for route segments arriving at each of the 20 airports by 'busy' and 'dull' time interval ('Busy' - 7:00 - 22:59, 'Dull' - 23:00 - 06:59); (2) Average airborne delays for route segments arriving at each of the 20 airports, by 'busy' and 'dull' time intervals; and (3) Average ground times and delays for route segments departing and arriving the 20 airports, by 'busy' and 'dull' time intervals. A table showing the monthly average of airborne arrival delays at a summary airport which represents the total of the 20 study airports is also included. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A050 328 17/9 1/5
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Radar Station Evaluation Report, Spangdahlem AB, Germany. (U)

DESCRIPTIVE NOTE: Tracals evaluation rept. (Final),
JUN 77 80P Minsterl,James R. ;
REPT. NO. 77/68R-24

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Airport radar systems, *Radar tracking, Radar beacons, Test and evaluation, Military facilities, Climate, Sensitivity, Signal processing (U)
IDENTIFIERS: AN/FPN-47, AN/TPX-42A, AN/FPN-16, Airport surveillance radar, ASR(Airport Surveillance Radar), PAR(Precision approach radar), Precision approach radar (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 17-27 June 1977, to define the capabilities and limitations of the radar approach control (RAPCON) facility at Spangdahlem AB, Germany. The RAPCON is comprised of the AN/FPN-47 airport surveillance radar (ASR), the AN/TPX-42A(V) Type III air traffic control radar beacon system (ATCRBS), the AN/FPN-16 precision approach radar (PAR). and the associated power systems. The report includes a description of the useable ASR coverage, a description of the ATCRBS coverage and tracking capabilities, a description of PAR coverage and tracking capabilities, and the analysis of flight and equipment performance data. The capabilities and limitations presented are a guide for expected system performance until there is a modification to or relocation of the equipment or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A050 319 17/9 1/5 5/2
MITRE CORP MCLEAN VA METREK DIV

Radar Training Facility Program Implementation Plan, (U)

SEP 77 172P Asch,A. ;Beeker ,G. ; Wuebker,L. ;
CONTRACT: DOT-FA-69NS-162
MONITOR: FAA-ED 21-5

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar trainers, *Air traffic control systems, *Radar operators, Systems engineering, Test methods, Quality assurance, Acceptance tests, Maintenance, Architecture (U)
IDENTIFIERS: RTF(Radar Training Facility), Computer software, Radar training facility, Configuration management, Training facilities, Aeronautical centers (U)

This document presents information to be utilized for program guidance and management direction during the development and implementation phases of the Federal Aviation Administration's Radar Training Facility (RTF). The RTF is to be installed at the Aeronautical Center as an element of the FAA Academy for academy level radar training and effective evaluation of developmental terminal and en route Air Traffic Control Specialists. (Author) (U)

AD-A049 948 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. Special Evaluation Report. AN/FPN-47 Radar System K.I. Sawyer AFB, Michigan, 17-25 August 1977, (U)

AUG 77 66P Loney,Charles D. ;
REPT. NO. 77/S-109

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar landing control, *Airport radar systems, Surveillance, Radar antennas, Gain, Area coverage, Antenna feeds, Test and evaluation (U)
IDENTIFIERS: AN/FPN-47 (U)

This traffic control and landing systems (TRACALS) special radar evaluation report presents data collected from 17-25 August 1977, to investigate the antenna system configuration and define the capabilities and limitations of the AN/FPN-47 Airport Surveillance Radar at K.I. Sawyer AFB, Michigan. This report describes the configuration of the antenna system, defines the antenna gain pattern, describes the useable ASR coverage and tracking capabilities, and analyzes flight and equipment performance data. The capabilities and limitations presented are a guide for expected performance until there is a modification to or relocation of the equipment. (Author) (U)

AD-A049 870 1/5 1/3 17/7 9/3
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Cockpit Displayed Traffic Information Study. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 77 249P
REPT. NO. D6-42968
CONTRACT: NAS1-13267
MONITOR: FAA-EM 77-18

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Display systems, Cockpits, Avionics, Air traffic, Monitoring, Indicating instruments, Horizontal orientation, Information processing, Air traffic control terminal areas, Aircraft landings, Planning, Flight testing (U)
IDENTIFIERS: Cockpit displayed traffic information, CDTI(Cockpit Displayed Traffic Information), Electronic horizontal situation indicators, EHSI(Electronic Horizontal Situation Indicators), Design, Situation displays (U)

The purpose of the Cockpit Displayed Traffic Information (CDTI) study was to provide the planning base for conducting a flight test evaluation of an Electronic Horizontal Situation Indicator (EHSI) incorporating the position of other air traffic as derived from ground sensors. Study objectives were to: (1) define and scope a system concept for an airborne information display using ground derived ATC and ATC related information (this concept to be based on measurable potential ATC system benefits that are amenable to experimental verification via simulation and flight tests); and (2) prepare an outline of a simulation and flight test program which includes the NASA 515 aircraft, the Langley Research Center traffic simulation and other aircraft and simulations. Testing in a busy terminal area was also to be planned. The general approach was to review the extensive work of other investigators on the CDTI and related concepts,

(U)

AD-A049 811 17/7 12/1 9/2
IIT RESEARCH INST ANNAPOLIS MD

Prediction Model of ATCRBS Transient Effects Performance. (U)

DESCRIPTIVE NOTE: Final rept. 1974-1975,
JUN 76 53P Theberge,Norman ;
CONTRACT: F19628-76-C-0017, DOT-FA70WAI-175
MONITOR: FAA-RD,ECAC 77-75,PR-76-017

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Control Radar Beacon System, *Performance(Engineering), *Predictions, *Mathematical models, *Computerized simulation, Electromagnetic compatibility, Spectrum analysis, Radar pulses, Probability, Short range(Time), Interference, False signals, Data bases, Terrain models, Transponders, AN/FYQ-4 (U)
IDENTIFIERS: UNIVAC 1110 Computers, ARTS 3(Automated Radar Terminal System 3), Automated radar terminal system 3, LPN-FAA-213-661-10, AN/TPX-42 (U)

A pulse-by-pulse simulation of the Air Traffic Control Radar Beacon System (ATCRBS), developed by the Transportation Systems Center of the DOT, was adapted by the Electromagnetic Compatibility Analysis Center (ECAC) for use with the UNIVAC 1110 computer. The model was made more flexible by adding the capability to use automated input information about ATCRBS and aircraft deployment. A terrain mode was added so the effects of terrain on coverage can be assessed. In addition, routines were added that simulate the effects of staggered and jittered PRF's and transponder reply codes, so that near-synchronous interference problems, broken and false targets, and other time-related anomalies can be investigated. Within the scope of this project, code-data-sampling and code-validation functions of the following digital processors have been included in the simulation: ARTS III, AN/TPX-42, and the AN/FYQ-49 common digitizer. (Author) (U)

AD-A049 793 1/5 14/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION SYSTEM PLANS

An Analysis of Continued Operation of Selected Airport Traffic Control Towers (ATCT). (U)

DESCRIPTIVE NOTE: Draft rept.,
JUN 77 75P Zaidman,Steven ;
REPT. NO. FAA-ASP-77-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control system analysis, *Cost analysis, *Cost benefits, Criteria, Removal, Air traffic control systems, User needs, Aviation safety (U)

This report evaluates the merits of continued operation of existing FAA airport traffic control towers using the benefit-cost technique. Considered are airport safety and efficiency benefits as well as the costs of continued facility operation and of dismantling and relocation. The analysis identifies 73 current tower locations as not worthy of continued operation on economic grounds. Only nine sites are selected as candidates for decommissioning when using existing noneconomic discontinuance criteria. The study is divided into three parts. Part A describes the detailed benefit-cost rationale and methodology. Part B provides an historical account of the evolution of tower establishment and discontinuance criteria. Part C examines the impact of uneconomical tower locations identified by the benefit-cost analysis, i.e., those sites where costs of continued tower operation exceed benefits. This part also offers several alternative options for formulating an agency policy for discontinuing tower operations. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A049 743 1/2
ARINC RESEARCH CORP ANNAPOLIS MD

Investigations to Support Phase I of the USAF Midair Prevention Systems Program (MAPS). (U)

DESCRIPTIVE NOTE: Final rept. Jun-Oct 77,
OCT 77 110P Crum,F. ;Haspert,K. ;
Kowalski,S. ;Sullivan,N. ;Underwood,J. ;
REPT. NO. 1924-01-1-1676
CONTRACT: F09603-77-A-3104
MONITOR: ASD TR-77-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Aviation safety, *Air traffic control systems, *Collision avoidance, Inflight, Prevention, Flight control systems, Flight maneuvers, Hazards, Formation flight, Refueling in flight, Civil aviation, Collisions, Aircraft landings, Discrete address beacon systems, Warning systems (U)

The objectives of the study presented in this report were to: further define USAF requirements and objectives in reducing midair collisions; establish organizational relationships and participation in midair prevention efforts; investigate possible alternative methods to reduce USAF midair collisions; and further define follow-on phases of the Midair Prevention Systems (MAPS) program that the USAF could undertake to reduce midair collision potential. This report provides background information and analysis on the midair collision experiences of the USAF from 1968 through June 1977 and the near midair collision experiences from 1975 through June 1977. The midair and near midair collision information is analyzed from many different aspects such as altitude, type flight plan, category of aircraft, mission activity, commands, and phase of flight. Midair collision programs were identified and actions that could be taken by the USAF to reduce midair collision potential are specified. This report also identifies various organizations that would be involved with the USAF midair problem and identifies their relationships in attempting to reduce the midair potential. (U)

AD-A049 348 17/7
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

RAF Bentwaters, United Kingdom. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 77 92P Collier,John D. ;
REPT. NO. 77/68T-25

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *TACAN, Radio stations, Great Britain, Air Force equipment, Distance measuring equipment, Azimuth, Test and evaluation, Area coverage, Antenna radiation patterns, Antennas, Sites (U)
IDENTIFIERS: TRACALS project, AN/GRN-19A (U)

This Traffic Control and Landing Systems (TRACALS) station evaluation geport presents the analysis of data collected to define the capabilities and limitations of the AN/GRN -19A tactical air navigation (TACAN) system with an AN/GRA-121A antenna and associated power equipment at RAF bentwaters, United Kindom during 28 July-5 Aug 1977. The report defines the theoretical coverage limits of the TACAN in the siting environment. The airborne evaluation results are presented to define azimuth and DME accuracy, the extent of useable coverage, the interference field pattern and the quality of course structure. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or in the horizon screening. (Author) (U)

AD-A049 319 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

ASR Special Evaluation Report (AN/MPN-13A Electromagnetic Tilt and Clutter Environment) March AFB, CA. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
DEC 77 18P Pinney,Earl T. , Jr;
REPT. NO. 77/66S-112

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Radar antennas, *Site selection, Air traffic control systems, Radar clutter, Electromagnetic compatibility, Test and evaluation, Radar interference, Range(Distance), Accuracy, Error analysis (U)
IDENTIFIERS: *AN/MPN-13A, *TRACALS(Traffic Control and Landing System), *ASR(Airport Surveillance Radar), AN/GPX-8A (U)

This traffic control and landing systems (TRACALS) radar special evaluation report presents data collected from 12-16 September 1977 to determine the electromagnetic tilt and to document the clutter environment of the AN/MPN-13A airport surveillance radar (ASR) at March AFB, CA. The data presented are valid until there is an addition, deletion, or relocation of equipment. (Author) (U)

AD-A049 315 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

High-Altitude Area Navigation (RNAV) Enroute Simulation. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Aug 76,
DEC 77 87P Willett,Francis M. , Jr.;
Taylor,Mark R. ;
REPT. NO. FAA-NA-77-4
MONITOR: FAA-RD 77-128

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radio navigation, Flight paths, High altitude, Digital simulation, Real time, Air space, Collision avoidance, Systems analysis, Very high frequency, Omnidirectional antennas, Air traffic controllers, Test and evaluation (U)
IDENTIFIERS: *Area navigation (U)

A four-part dynamic simulation using two systems of navigation, area navigation (RNAV) and very high frequency omnidirectional radio range (VOR), was conducted using the Digital Simulation Facility (DSF) at the National Aviation Facilities Experimental Center (NAFEC). The objectives were to: (1) validate the results derived from fast-time simulation tests of RNAV and Jet-VOR route structures through real-time simulation tests, (2) determine whether benefits resulted from the application of RNAV in the high-altitude enroute environment, and (3) establish the impact that the number of potential aircraft conflict situations has on the ATC system and system user. Simulations were conducted in a fast-time mode, without controller intervention, for an area encompassed by five high-altitude Chicago Air Route Traffic Control Center (ARTCC) sectors and for a single selected sector of the five. Real-time simulations, with controller intervention, were conducted for both the five- and one-sector configurations. (U)

AD-A049 305 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

IFR Aircraft Handled Forecast By Air Route Traffic Control Center, Fiscal Years 1978-1989, (U)

NOV 77 48P Hannan,Bernard ;
REPT. NO. FAA-AVP-77-34

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Instrument flight, Air traffic control system analysis, Forecasting, Air traffic, Planning, Geographical distribution, Tables(Data), Federal budgets, Requirements, Air transportation, Civil aviation, Commercial aviation, Military aircraft, Resource management (U)

The report presents the forecasts of Instrument Flight Rule (IFR) aircraft handled by FAA air route traffic control centers (ARTCC). It serves as a base for the FAA planning and budget process in determining future requirements for facilities, equipment and manpower. The forecasts show that total aircraft handled will increase from 25.7 million in FY 1977 to 41.5 million in FY 1989. These national total numbers along with those for the intervening years are broken down by FAA region and by each air route traffic control center in this report. (Author) (U)

AD-A049 156 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) SCOTT AFB IL

TRACALS Evaluation Report. TACAN Special Evaluation Report, Barksdale AFB, LA, 13 - 17 September 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 77 38P Barnhart,Kathryn Y. ;
REPT. NO. 77/66S-110

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *TACAN, Jet bombers, Jet transport planes, Specifications, Locking(Electronics), Test and evaluation (U)
IDENTIFIERS: TRACALS Project, AN/GRN-20B, B-52 aircraft, C-140 aircraft, Unlocks (U)

This report presents the results of the 13-17 September 1977 special (TRACALS) evaluation of the Barksdale AFB, LA, AN/GRN-20B TACAN. The evaluation was requested by SACCA as a result of unlocks experienced by B-52 aircraft. During the evaluation the TACAN ground equipment was thoroughly checked, and the TACAN service volume was thoroughly probed by a C-140 flight inspection aircraft. The ground equipment was within T.O. specifications, and no DME unlocks were found. The facility passed all flight inspection requirements. (Author) (U)

AD-A049 049 5/9 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Development of New Selection Tests for Air Traffic Controllers, (U)

DEC 77 12P Dailey,John T. ;Pickrel, Evan W. ;
REPT. NO. FAA-AM-77-25

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Personnel selection, *Aptitude tests, Test construction(Psychology), Air traffic, Aviation safety, Threat evaluation, Perception(Psychology), Pattern recognition (U)

This report describes the development of a new Multiplex Controller Aptitude Test for initial screening of FAA Air Traffic Controller applicants. Its content includes the traditional types of aptitude test items used for today's screening. In addition it includes measurement of the ability to identify potential conflicts in air traffic, a skill that has been demonstrated experimentally to have a significant relation to success in the ATC speciality. Alternate forms of the test have been developed in a format that meets Civil Service test administration requirements. The test has been administered experimentally to groups whose abilities approximate those of the applicant population, and results indicate that it has satisfactory reliability characteristics. It has been administered experimentally to incoming students at the FAA ATC Academy and personnel on the job at operational facilities, and constantly produced higher correlations with ATC success than any other test used in the validation studies. The available data indicate that this new and customized instrument promises to be a significant improvement over the existing battery for screening FAA Air Traffic Controller applicants. (Author) (U)

AD-A048 796 5/9 17/7
LOGICON INC SAN DIEGO CALIF

Air Intercept Controller Training: A Preliminary Review. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Jun 77,
JUL 77 116P Grady,M. W. ;Hicklin,M. B. ;Miller,R. M. ;
CONTRACT: N61339-77-M-1058
MONITOR: NAVTRAEQUIPC 77-M-1058-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Naval training, *Aircraft intercept control systems, Courses(Education), Naval personnel, IFF systems, Speech recognition, Speech transmission, Antisubmarine aircraft, Vocabulary, Voice communications, Training devices, Control simulators (U)
IDENTIFIERS: LPN-NAVTRAEQUIPCEN-3753-2P2 (U)

This report describes the current Air Intercept Controller (AIC) course conducted by the Navy. The report discusses the utilization of advanced technologies and training system designs to improve the AIC training program. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A048 589 17/7 1/5
IIT RESEARCH INST ANNAPOLIS MD

The Impact of a Proposed Active BCAS on ATCRBS Performance in the Washington, D. C., 1981 Environment. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 77 48P Theberge,Norman ;
CONTRACT: F19628-76-C-0017, DOT-FA70WAI-175
PROJ: 649E
MONITOR: ECAC,FAA/RD PR-77-037,77/140

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control radar beacon system, *Discrete address beacon systems, *Aviation safety, Performance, Collision avoidance, Flight maneuvers, Electromagnetic compatibility, Transponders, Interrogators, Target detection, Computer applications, Computer program verification (U)

A computer model of the proposed active Beacon Collision Avoidance System (BCAS) was developed to investigate the impact of BCAS on the Air Traffic Control Radar Beacon System (ATCRBS) ground system. Predictions were made for the early 1981 Washington, D.C., environment. Two ground environments were simulated, an all-ATCRBS environment and a 25%/75% Discrete Address Beacon System (DABS)/ATCRBS mix. Airborne fruit rates and the effect of BCAS/DABS mode power programming on interference were also predicted. (Author) (U)

AD-A048 303 9/2 17/7
ROYAL RADAR ESTABLISHMENT MALVERN (ENGLAND)

A Report on Software Functional Variability. (U)

DESCRIPTIVE NOTE: Technical note, JAN 77 45P Allen,A. D. ;Crowther,J. H. ;
REPT. NO. RRE-TN-789

UNCLASSIFIED REPORT

DESCRIPTORS: *Computer programming, *Air traffic control systems, *Fault tolerant computing, Error correction codes, Pilot studies, Time sharing, Resource management, Real time, Computer programs, Reliability, Great Britain (U)

Proposals are made for a software structure that provides a high degree of fault tolerance and is appropriate for a large, complex, real-time system such as an air traffic control system. Further proposals describe how the structure can be extended to allow software development work to be carried out in parallel with operational use of the system. A pilot system has been implemented on a MOdular-One multiprocessor computer in order to test some of the concepts. An assessment of the work indicates that it has been only partly successful and some problems of a fundamental nature remain to be investigated. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A048 246 17/7 1/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Proposed Technical Characteristics for the Discrete Address Beacon System (DABS). (U)

DESCRIPTIVE NOTE: Project rept., SEP 77 62P Welch,J. D. ;Robeck,P. H. ;
REPT. NO. ATC-71
CONTRACT: DOT-FA72-WAI-261
MONITOR: FAA/RD 77/143

UNCLASSIFIED REPORT

DESCRIPTORS: *Discrete address beacon systems, *Air traffic control radar beacon systems, *Air traffic control systems, Transponders, Data links, Digital systems, Avionics, Antenna radiation patterns, Surveillance, Surface to air, Error detection codes (U)
IDENTIFIERS: LPN-FAA-034-241-012 (U)

This report parallels the Proposed U.S. National Aviation Standard for the Discrete Address Beacon System. However, in addition to the material contained in the Proposed Standard this document provides a more detailed performance specification for the DABS transponder including specifications on transponder receiver sensitivity and performance in interference. It includes specifications for a proposed digital datalink interface and defines message and control fields associated with experimental transponder data applications. It also includes guidance material on the performance of an optional transponder antenna diversity scheme. (Author) (U)

AD-A048 240 17/7 17/9 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Mountain Home AFB, Idaho 12-23 July '977, (U)

JUL 77 89P Pinney,Earl T. , Jr;
REPT. NO. 77/66R-104

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control radar beacon systems, *Radar landing control, *Airport radar systems, Radar tracking, Performance(Engineering), Operational test and evaluation, Airport control towers, Terminal flight facilities, Air Force facilities, Radar equipme (U)
IDENTIFIERS: *AN/FPN-47, *AN/TPX-42A(V)3, *AN/FPN-16, Traffic control and landing systems, Radar approach control, Airport surveillance radar, Precision approach radar, Mountain Home Air Force Base (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 12-23 July 1977, to define the capabilities and limitations of the radar approach control (RAPCON) facility at Mountain Home AFB, ID. The RAPCON is comprised of an AN/FPN-47 airport surveillance radar (ASR), AN/TPX-42(A)V Type III air traffic control radar beacon system (ATCRBS), An/Fpn-16 precision approach radar (PAR), and associated power systems. This report includes descriptions of the useable ASR coverage and tracking capabilities, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR and ATCRBS systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

AD-A048 112 1/5 1/2 9/2
DUNLAY (WILLIAM J) JR BALA CYNWYD PA

Airport Improvement Task Force Delay Study: Delay Model Validation Plan. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 77 55P Dunlay,William J. , Jr;
CONTRACT: W1-77-2412-1
MONITOR: FAA-EM 77-17

UNCLASSIFIED REPORT

DESCRIPTORS: *Airports, *Air traffic, *Scheduling, *Computerized simulation, Delay, Computer program verification, Estimates, Mathematical prediction, Taxiing, Takeoff, Arrival, Ground traffic, Flow rate, Computer logic, Input output models, Validation, Stochastic processes, Air traffic control systems, Queueing theory (U)

A validation plan is presented for an airside simulation model. The plan stresses basic principles of validation and inherent problems associated with comparing simulation model delay estimates with observable real-world data. A methodology is proposed that consists of three major steps: (1) evaluation of model logic, inputs, and outputs; (2) comparison of model estimates with collected data; and (3) a sensitivity analysis of the delay simulation model. A Model Validation Group, established to oversee the validation process, is described. Suggestions are given on sources of data on airside operations for model inputs and for comparisons with model estimates. (Author) (U)

AD-A047 967 17/7 20/12
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

SSILS Station Evaluation Report McChord AFB, WA. (U)

DESCRIPTIVE NOTE: Final rept., MAY 77 114P Clark,Allen D. ;
REPT. NO. 77/66N-99

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Air traffic control systems, *Instrument landings, *Solid state electronics, Test and evaluation, Limitations, Performance(Engineering), Ground stations, Glide slope, User needs, Atmospheric refraction, Terrain, Air Force facilities (U)
IDENTIFIERS: *AN/GRN-27, *SSILS(Solid State Instrument Landing System), Tracals, Localizers (U)

This report presents the results of the 3-15 May 1977 evaluation of the McChord AFB AN/GRN-27 SSILS, and their associated power systems. The Evaluation was conducted to observe the facility in its installed environment and to determine its capabilities and limitations. Results show that the facility is capable of satisfying the users' requirements. The results obtained can be used as a guide to anticipated performance until there is a significant change in either ground equipment, siting, or screening. (Author) (U)

AD-A047 930 9/2 17/7
MITRE CORP MCLEAN VA METREK DIV

Distributed Processing Applied to the Flight Service Station Modernization Program, (U)

AUG 77 203P Fowler,T. B. ;
REPT. NO. MTR-7576
CONTRACT: DOT-FA69NS-162
MONITOR: FAA/RD 77-161

UNCLASSIFIED REPORT

DESCRIPTORS: *Minicomputers, *Air traffic control systems, *Multiprocessors, *Information centers, Air traffic, Computer programming, Automatic, Information exchange, Time sharing, Data processing, Weather communications, Flight paths, Mathematical models, Air transportation (U)
IDENTIFIERS: Flight service station (U)

This report is an investigation of the feasibility of using minicomputers in a distributed processing configuration for the Flight Service Station modernization program. It is based on studies of existing distributed processing configurations, many of which were visited by members of the MITRE/FAA distributed processing study team; on information supplied by vendors; and on an analysis of two sample configurations taking into account available data concerning Flight Service Station (FSS) functions. Distributed Processing, as applied to the FSS modernization program, is analyzed with respect to cost, degree of risk, and expected level of performance. Recommendations are given based upon analysis, research, and visits to existing distributed processing installations. (Author) (U)

AD-A047 847 17/7 1/5 9/3 17/2.1
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER ANNAPOLIS MD

Automated UHF Frequency Assignment System for FAA Air Traffic Control Communications. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 77 94P Hensler,Thomas ;Morrow,John ;
REPT. NO. ECAC-pr-77-012
CONTRACT: F19628-76-C-0017
PROJ: 649E
MONITOR: FAA-rd 77-96

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Frequency allocation, *Communication and radio systems, Ultrahigh frequency, Computer programs, Automation, Probability, Radio interference (U)
IDENTIFIERS: Automated Frequency Selection, PE65704F (U)

An automated UHF Frequency Assignment System (UHF-FAS) was developed as a means of providing frequency assignment plans for FAA Air Traffic Control (ATC) UHF communications facilities. The UHF-FAS consists of a series of computer programs and can be used to investigate the advantages of different frequency assignment strategies (including partial and complete assignments), detect assignments that do not meet the FAA criterion, provide statistical analyses, and plot ATC service volumes. (Author) (U)

AD-A047 567 5/9 1/5 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Simulator Pilot Consoles for NAS Enroute and ARTS III Facilities. (U)

DESCRIPTIVE NOTE: Final rept. Jun 76-May 77,
NOV 77 103P House,Kenneth ;Karovic, Stephen ;Rundall,Theodore ;
REPT. NO. FAA-NA-77-36
MONITOR: FAA/RD 77/136

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Computer aided instruction, Display systems, Functional analysis, Problem areas, Errors, Man computer interface, Computerized simulation, Flight paths, Feedback, Experimental design, Feasibility studies, Cost analysis (U)
IDENTIFIERS: ARTS(Automated radar terminal system), Automated radar terminal system, LPN-FAA- 216-103-100 (U)

This report describes the work effort and results of a feasibility and desirability study of replacing simulator pilot consoles in the field with more cost effective, easier to learn and use devices. Technically, such an action was found to be feasible and could result in a significantly improved simulator pilot operating capability. A touch panel input device using a menu list concept with target to map association, performed by an interface processor, is recommended. As an aid to deciding the desirability of proceeding with such a procurement, the costs of various alternatives were estimated. The costs of the preferred system was found to exceed the budget, unless a reduced number of consoles or sites were equipped, in which case the average cost per console was increased substantially. The information from field input was logically analyzed to arrive at the conclusion that the limited life potential of the system, the operational limits on increased training, and high overall cost make the desirability of the action questionable. (Author) (U)

AD-A047 061 17/7 17/9
IIT RESEARCH INST ANNAPOLIS MD

Analysis of the Effect of Out-of-Tolerance Transponders on an En Route ATCRBS. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 76 88P Leung,Kai ;
CONTRACT: DOT-FA70WAI-175
PROJ: 649E
MONITOR: ECAC-FAA-RD,GIDEP PR-76-003-77-88, E091-0072

UNCLASSIFIED REPORT

DESCRIPTORS: *Transponders, *Air traffic control systems, *Radar beacons, Tolerance, Air traffic control system analysis, Performance(Engineering), Digital systems, Radar antennas, Electromagnetic compatibility, Airborne, Range(Distance), Sidelobes, Surveillance, Radar, Detection, Calibration (U)
IDENTIFIERS: PE65704F (U)

The Air Route Surveillance Radar at Suitland, Maryland was selected as the location to predict the performance of the three types of transponders considered in the analysis (Military, Air Carrier, and General Aviation). The interrogator environment consisted of IFF/ATCRBS interrogators deployed within an 850 nautical-mile radius of Suitland and the aircraft transponder deployment consisted of aircraft at various azimuths, altitudes, and ranges within a 200 statute-mile radius of Suitland. For the deployed aircraft, different percentages of aircraft were designated as having out-of-tolerance transponders. The AIMS Performance Prediction Model was used to predict the performance of the Suitland interrogator for both in-tolerance and out-of-tolerance transponder characteristics for the three types of transponders analyzed. (U)

AD-A047 013 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. SSILS Station Evaluation Report. Tinker AFB, Oklahoma, 14-22 April and 4-6 May 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 77 75P Barnhart,Kathryn Y. ;
REPT. NO. 77/66N-98

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Approach indicators, *Landing aids, *Instrument landings, Air Force operations, Solid state electronics, Glide slope, Radio beacons (U)
IDENTIFIERS: *TRACALS, *AN/GRN-27, *SSILS, AN/GRN-28 (U)

This report presents the results of the 14-22 April and 4-6 May 1977 evaluation of the Tinker AFB AN/GRN-27 SSILS and its associated power systems. The evaluation was conducted to observe the facility in its installed environment, to determine its capabilities and limitations, and to determine the causes and possible solutions to facility problems. Results show that both the localizer and glide slope are capable of satisfying present user Category I requirements. Results obtained from the TRACALS evaluation can be used as a guide to anticipated performance until there is a significant change in either ground equipment, siting, or screening. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A046 848 17/7 1/5 17/9
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Radar Special Evaluation Report RAF Upper Heyford, U. K. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 77 69P Minsterl,James R. ;
REPT. NO. 77/68S-22

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Landing aids, *Radar equipment, *Radar antennas, *Radar stations, Comparison, Great Britain, Air Force equipment, Plan position indicators, Tilt, Radar clutter, Area coverage, Test and evaluation (U)
IDENTIFIERS: TRACALS, AN/MPN-14H, Radar shadows (U)

AS-1197 and AS-964 antenna assemblies at RAF Upper Heyford were compared to determine which antenna provided the best low level coverage. Tracks were flown against each antenna at a variety of tilts to determine the optimum tilt angle for each assembly. The AS-1197 antenna at a +3.0 deg tilt was judged to provide the best low level coverage. Results of tests conducted in November 1976 concerning the future relocation of the RAPCON facility are also included in this report. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A046 829 17/9 1/5
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Preliminary Limited Surveillance Radar (LSR) Cost/Benefit Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Dec 76-Apr 77,
OCT 77 52P Rempfer,Paul S. ;
REPT. NO. TSC-FAA-77-16
MONITOR: FAA-ASP 77-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Search radar, *Cost benefits, *Airport radar systems, Short range(Distance), Air traffic control systems, Air traffic control system analysis, Costs (U)
IDENTIFIERS: Limited surveillance radar (U)

This report presents the findings of a cost/benefit analysis of the deployment of a new Limited Surveillance Radar (LSR). An LSR is an inexpensive, single channel, short-range (about 20 miles), primary radar for use at approach control facilities which cannot economically justify an Airport Surveillance Radar/Radar Beacon System (ASR/RBS). An LSR can also be used in tower cabs to aid in VFR operation where a BRITE display is not feasible due to coverage limitations dictated by obstructions or distance from the parent radar facility. The study is preliminary in that it is brief and uses rough estimates and assumptions for both benefits and costs. Its purpose is to give a gross estimate of the current deployment potential of the LSR and to aid in decisions regarding further system analysis, development, and testing. (Author) (U)

AD-A046 826 5/10 6/19
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Stress in Air Traffic Personnel: Low-Density Towers and Flight Service Stations, (U)

SEP 77 19P Melton,C. E. ;Smith,R. C. ;McKenzie,J. M. ;Wicks,S. M. ; Saldivar,J. T. ;
REPT. NO. FAA-AM-77-23

UNCLASSIFIED REPORT

DESCRIPTORS: *Stress(Psychology), *Anxiety, *Air traffic controllers, *Stress(Physiology), Heart rate, Urine, Biochemistry, Steroids, Epinephrine, Levarterenol, Measurement, Metabolites, Excretion, Indexes (U)
IDENTIFIERS: LPN-AM-C-77-PHY-83 (U)

Stress and anxiety levels were measured in 10 air traffic control specialists (ATCS) at two low-traffic-density towers, Fayetteville (FYV), Arkansas, and Roswell (ROW), New Mexico, and in 24 flight service (FS) specialists at Oklahoma City (OKC), Oklahoma, Fayetteville, Arkansas, and Roswell, New Mexico. Physiological measurements consisted of heart rate and urine biochemical analysis for 17-ketogenic steroids, epinephrine, and norepinephrine. On-duty arousal in ATCS's and FS specialists was evident both physiologically and psychologically; such arousal was within psychologically normal limits and was generally low physiologically compared to other air traffic control (ATC) facilities that have been studied in the past. Physiological stress levels at these low-density towers and flight service stations were also low compared to other ATC facilities that were studied previously. It is concluded that it is inappropriate to describe all air traffic control work, as is commonly done in the popular press, as unusually stressful. Such accounts in the popular press tend to deal with the exceptional rather than with the typical controller or facility. (Author) (U)

AD-A046 756 17/7 9/1 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of Thomson/CSF Five-Bay VOR Antenna. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Nov 76,
OCT 77 77P Dong,James G. ;
REPT. NO. FAA-NA-77-7
MONITOR: FAA/RD,GIDEP 77/82,E089-0135

UNCLASSIFIED REPORT

DESCRIPTORS: *Omnidirectional antennas, *Air traffic control systems, *Antenna arrays, Very high frequency, Stacking, Multipath transmission, Computer applications, Nulls(Amplitude), Antenna radiation patterns, Reflection, Range(Distance), Area coverage (U)
IDENTIFIERS: *VOR antennas, LPN-FAA-041-305-800 (U)

A stacked five-bay VOR antenna was evaluated at the National Aviation Facilities Experimental Center (NAFEC). The antenna was designed for use with a conventional very high frequency omnidirectional radio range (VOR) system to reduce multipath effects by diminishing ground reflections. Tests included airborne and ground measurements to assure operational compatibility of the antenna with FAA transmitting equipment. Measurements were made on the complete array, bays, and antenna elements. Test results indicated that the bearing error was marginal and the large sidelobes caused multipath reflection from nearby obstacles. A computer program used for the analysis of vertical plane radiation patterns in stacked arrays is included. (Author) (U)

AD-A046 543 1/2 1/5 5/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Terminal Area Forecast 1978-1988. (U)

JAN 77 353P
REPT. NO. FAA-AVP-77-17

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: See also report dated Jan 76, AD-A026 753.
DESCRIPTORS: *Civil aviation, *Air traffic, *Management planning and control, Forecasting, Airports, Air traffic control terminal areas, United States, Statistical data, Airport control towers, Terminal flight facilities, Manpower, Air traffic controllers, Regions, Geographical distribution, Commercial aviation (U)
IDENTIFIERS: Federal aviation agency (U)

This report contains forecasts for air carrier and air taxi enplanements, air carrier and air taxi aircraft operations, itinerant, total and instrument aircraft operations, and instrument approaches at 894 airports throughout the United States. The airports in this publication include all those with Federal Aviation Administration air traffic control towers and those with air carrier service. The report is intended as an aid for anticipating future manpower and equipment needs at terminal areas. (Author) (U)

AD-A046 509 17/7 22/2
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume I. Executive Summary. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75,
AUG 77 43P Protopapa,Sejfi ;
REPT. NO. D6-44052-VOL-1
CONTRACT: DOT-TSC-707
MONITOR: FAA-RD 75-173-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A042 146.
DESCRIPTORS: *Air traffic control systems, *Communication satellites, Integrated systems, L band, Communications networks, Signal generation, Signal processing, Avionics, Voice communications, Multipath transmission, Multichannel communications, Modems, Data processing, Range finding, Aircraft antennas, Error analysis, Phased arrays (U)
IDENTIFIERS: *ATS-6 satellite (U)

The U.S. Department of Transportation (DOT), Federal Aviation Administration (FAA) program for air traffic control (ATC) experimentation and evaluation with the ATS-6 satellite was part of the Integrated ATS-6 L-Band Experiment. All tests were performed between September 1974 and April 1975. The U.S. DOT aeronautical program consisted of both ATC communications demonstration and technology tests. In support of the aeronautical satellite (AEROSAT) program, tests were designed to collect satellite-aircraft signal propagation data, evaluate L-band avionics hardware designs, and perform preliminary satellite voice and data communications demonstration tests. (U)

AD-A046 292 9/1 17/9 1/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Coaxial Magnetron Spectra and Instabilities. (U)

DESCRIPTIVE NOTE: Project rept.,
JUN 77 73P Labitt,M. ;
REPT. NO. ATC-74
CONTRACT: F19628-76-C-0002, DOT-FA71-WAI-242
MONITOR: FAA-RD 77-31

UNCLASSIFIED REPORT

DESCRIPTORS: *Magnetrons, *Airport radar systems, Instability, Coaxial configurations, Spurious effects, Moving target indicators, Radiofrequency spectroscopy, Radar clutter, Air traffic control radar beacon systems, S band (U)
IDENTIFIERS: AN/ASR-7 (U)

Application of advanced radar clutter rejection techniques to FAA airport surveillance and enroute radars is constrained by inherent instabilities and spectral properties of the device used in the radar transmitter to generate high level RF pulse energy, and the degree to which its spectrum can be influenced by the circuit in which it operates. Coaxial magnetrons are believed to be spectrally pure, controllable and stable, and to embody other characteristics such as long life, which make them attractive replacements for the magnetrons presently employed. This report summarizes the results of extensive measurements made on a conventional S-band magnetron (presently employed in the ASR-7 radar) and a coaxial magnetron of equivalent pulse and power rating to compare their instabilities and spectral properties. (Author) (U)

AD-A045 977 17/7
STANFORD TELECOMMUNICATIONS INC MCLEAN VA

The Single-Site Collision Avoidance System (SS-CAS). (U)

SEP 77 150P Schuchman,L. ;Orr,R. ;
CONTRACT: F04701-75-C-0239
MONITOR: FAA-EM,GIDEP 77-8,E092-2398

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Air Traffic control systems, Data links, Synchronization(Electronics), Air traffic control radar beacon systems, Discrete address beacon systems, Radar beacons, Radar tracking, Avionics, Transponders, Omnidirectional antennas, Position finding (U)
IDENTIFIERS: *Single site collision avoidance systems, SSCAS(Single Site Collision Avoidance Systems) (U)

SS-CAS is a unique beacon collision avoidance system which works in conjunction with the current and next generation air traffic control surveillance systems (ATCRBS and DABS). In its passive mode, SS-CAS provides three dimensional position of both user and target aircraft using beacon replies from only one ground-based DABS or ATCRBS interrogator. Full collision avoidance service is provided in both the all-ATCRBS environment of today, the all-DABS environment of tomorrow, and the intervening transition period. The ground and airborne equipments required are add-ons to the ground beacon and the airborne DABS units. A two-way data link separate from, but compatible in format with, the DABS data link provides the SS-CAS-Equipped aircraft with important site data. A tracker capable of reading reliable tracks through ATCRBS synchronous garble is employed. DABS replies arrive garble-free at the SS-CAS aircraft and are simple to track. An active mode and multi-site usage capability are available for performance enhancement in identified special situations. This report fully describes the SS-CAS concept as it functions in the all-ATCRBS, all-DABS and transition environments. (Author) (U)

AD-A044 811 17/7 20/14 1/5
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

TACAN Station Evaluation Report, Spangdahlem AB, Germany, 12-18 April 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 77 91P Collier,John D. ;
REPT. NO. 77/68-T-21

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRACALS Evaluation rept.
DESCRIPTORS: *Radio stations, *TACAN, *Air traffic control systems, Electromagnetic wave propagation, Climate, Radiation patterns, Radiofrequency interference, Antennas, Power equipment, Atmospheric refraction, Azimuth, Distance measuring equipment, Accuracy, Test and evaluation, Transponders, Area coverage (U)
IDENTIFIERS: AN/GRN-19A, AN/GRA-121 (U)

This Traffic Control and Landing Systems (TRACALS) station evaluation report presents the analysis of data collected to define the capabilities and limitations of the AN/GRN-19A tactical air navigation (TACAN) system with AN/GRA-121 antenna and associated power equipment at Spangdahlem Air Base, Germany, during 12-18 April 1977. The report defines the theoretical coverage limits of the TACAN in the siting environment. The airborne evaluation results are presented to define azimuth and DME accuracy, the extent of usable coverage, the interference field pattern, the quality of course structure, and cone of ambiguity. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or in the horizon screening. (Author) (U)

AD-A044 558 5/9 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

The Effect of Increased Monitoring Load on Vigilance Performance Using a Simulated Radar Display. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 16P Thackray,Richard I. ;Bailey, J. Powell ;Touchstone,R. Mark ;
REPT. NO. FAA-AM-77-18

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Radar operators, Radar target position simulators, Attention, Vigilance, Alertness, Boredom, Error analysis, Radar targets, Visual targets, Target discrimination, Performance(Human), Alphanumeric displays, Automation (U)

The present study examined the extent to which level of target density influences the ability to sustain attention to a complex monitoring task requiring only a detection response to simple stimulus change. The visual display was designed to approximate a futuristic, highly automated air traffic control radar display containing computer-generated alphanumeric symbols. Forty-eight male subjects, equally divided into three groups, were exposed to density levels of 4,8, or 16 targets. Ten critical stimuli (signals) were randomly presented during each half-hour of the 2-hour session. Detection latency to the critical stimuli in the 16-target condition was significantly greater than latency to the 4- and 8-target conditions. There was no evidence of performance decrement in the two lower density conditions. The 16-target condition showed a significant progressive increase in mean detection latency, which was primarily the result of an increase in long latencies. The hypothesized decline in attention associated with this condition appeared to be independent of any major change in arousal level. (Author) (U)

AD-A044 312 1/2 1/4 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Effects of RF Power Deviations on BCAS Link Reliability. (U)

DESCRIPTIVE NOTE: Project rept.,
JUN 77 32P Harman,William H. ;
REPT. NO. ATC-76
CONTRACT: DOT-FA75WAI-592
MONITOR: FAA-RD 77-78

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Radio beacons, *Air traffic control systems, Radio transmitters, Radiofrequency power, Power levels, Radio receivers, Radio links, Trigger circuits, Reliability(Electronics), Aircraft antennas, Gain, Antenna radiation patterns (U)
IDENTIFIERS: BCAS(Beacon Collision Avoidance Systems), Beacon Collision Avoidance Systems, DABS(Discrete Address Beacon systems), Discrete Address Beacon Systems, LPN-FAA-034-241-012 (U)

In the design of BCAS there is some freedom in the choice of specifications for BCAS transmitter power and receiver MTL(Minimum Triggering Level). Transmitter power should be high enough to provide adequate link reliability while being low enough to prevent interference problems. The question of providing adequate link reliability for the DABS mode of BCAS is addressed in this study. The study makes use of aircraft antenna gain data resulting from a model measurement program, and is otherwise analytical. It is concluded that appropriate nominal design values are transmitter power = 500 watts and receiver MTL = -77 dBm (referred to the BCAS unit). It is shown that these values provide sufficient power margin, at the air-to-air ranges appropriate for BCAS, so as to allow for adverse power deviations that might result from aircraft antenna gains, antenna cabling, and the expected transmitter and receiver deviations due to manufacturing nonuniformities and aging. (Author) (U)

AD-A044 256 17/7 17/2 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Simulation Model for Air Traffic Control Communications. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 77 35P Mulholland,Robert ;
REPT. NO. FAA-NA-76-30
MONITOR: FAA/RD,GIDEP 77/69,E092-0436

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, *Computerized simulation, Air traffic control terminal areas, Simulation languages, Computer programs, Aircraft landings, Altitude, Input output processing, Arrival, Takeoff, Ground controlled approach radar, Pilots, Air traffic controllers (U)
IDENTIFIERS: GPSS programming language, Fortran IV programming language, LPN-FAA-061-221-100 (U)

A computer simulation model designed to mimic second-by-second behavior of air/ground communications in an air traffic control sector is described. The model can be used to simulate any one of nine sector functions (e.g., high-altitude enroute, low-altitude transitional, radar-arrival control, etc.). The model exists as a computer program written in the GPSS V and FORTRAN IV languages. Input variables include aircraft arrival rate into sector, distribution of transmission length, distribution of number of transmissions in an air/ground exchange, etc. Response variables include sector aircraft loading, channel utilization, and communications delay. Model output can be obtained in the form of time series (e.g., minute-by-minute averages of channel utilization) exhibiting the dynamics of sector communications or simple averages of such series taken over several hours of simulated time. (Author) (U)

AD-A044 127 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1966TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report Kelly AFB, Texas. 17-26 May 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 77 90P Pinney,Earl T. ;
REPT. NO. 77/66R-101

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRACALS Evaluation report.
DESCRIPTORS: *Radar stations, *Airport radar systems, *Air traffic control systems, Test and evaluation, Aircraft landings, Ground controlled approach radar, Area coverage, Radar tracking, Moving target indicators, AN/TPX-42, AN/GPN-12 (U)
IDENTIFIERS: TRACALS(Traffic Control and Landing Systems), Traffic Control and Landing Systems, Kelley Air Force Base (U)

This traffic control and landing systems (tracals) radar station evaluation report presents data collected from 17-23 May 1977, to define the capabilities and limitations of the ground control approach (GCA) facility at Kelly AFB, Texas. The GCA is comprised of the AN/GPN-12 airport surveillance radar (ASR), the AN/TPX-42A(V) Type III air traffic control radar beacon system (ATCRBS), and the associated power systems. The report includes a description of the useable ASR coverage, a description of the ATCRBS coverage and tracking capabilities, and the analysis of flight and equipment performance data. The capabilities and limitations presented are a guide for expected system performance until there is a modification to or relocation of the equipment or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A044 004 17/2.1 9/3 1/5
IIT RESEARCH INST ANNAPOLIS MD

EMC Analysis of the Proposed AEROSAT VHF Subsystem with Current Inband Communications Systems. Volume I. (USA and Canada). (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 77 112P Slay,Frederick M. ;
CONTRACT: F19628-76-C-0017, DOT-FA70WAI-175
PROJ: 649E
MONITOR: ECAC,FAA-RD PR-75-071-Vol-1,77-56-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A043 904.
DESCRIPTORS: *Electromagnetic compatibility, *Communication satellites, *Air traffic control systems, Very high frequency, Mobile, Avionics, Ground stations, Antennas, Transmission lines, Ionospheric propagation, Multipath transmission, Radio receivers, Transmitter receivers (U)
IDENTIFIERS: AEROSAT satellite, PE65704F (U)

Information and guidelines are presented pertaining to the electromagnetic compatibility (EMC) of ground and airborne equipments in the Aeronautical Mobile VHF Service with the proposed AEROSAT VHF avionics. Volume I provides general guidelines for AEROSAT avionics compatibility with the VHF environment and predicted interactions with aeronautical mobile VHF equipments in the United States and Canada. Volume II addresses the worldwide VHF environment. The frequency bands considered are 125.4-126.0 MHz and 131.4-132.0 MHz. The analysis is based on the VHF frequency assignments in use when the study was performed (1975); co-channel operation of AEROSAT and air traffic control (ATC) stations is not considered. (AUthor) (U)

AD-A043 836 1/5 14/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION SYSTEM PLANS

Remoteness-Compensation Methodology for Benefit/Cost Establishment and Discontinuance Criteria. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 57P Loughlin,Richard M. :
REPT. NO. FAA-ASP-76-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Terminal flight facilities, *Air traffic control systems, *Remote areas, *Cost benefits, Air transportation, Remote systems, Remote terminals, Facilities, Construction, Costs, Installation, Housing(Dwellings), Alaska, Methodology, Compensation (U)
IDENTIFIERS: Airway Planning Standard Number 1 (U)

This report develops a procedure for adjusting the benefit/cost (B/C) ratios by which proposals for FAA terminal facilities in remote locations are evaluated. The procedure is applicable to the types of installations for which B/C analyses, based on nationwide average data, are incorporated in Airway Planning Standard Number One (FAA Order 7031.2B). Without such an adjustment, proposals for facilities in Alaska and other such locations could not realistically be compared with those for facilities in the contiguous 48 states (CONUS). The compensatory methodology first adjusts construction and installation costs according to a geographically differentiated index. Staff housing cost is subtracted. Exceptional site-preparation and other cost elements are not discarded, but their cost is made equivalent to the cost of doing the same work at a corresponding CONUS site. Next, for facilities to serve remote communities shown to be exceptionally reliant on air transportation, the ascribed benefits are adjusted upward. This benefit enhancement is proportional to the communities' aviation-dependency as determined by the model contained in this report, but it is not permitted to more than double intrinsic benefits. (U)

AD-A043 726 17/9 17/7 9/3
IIT RESEARCH INST ANNAPOLIS MD

Long Range Radar Compatibility Analysis in the 1300-1350 MHz Frequency Band. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 76 181P Grigg,David ;Pieper,Brian ;
Love,Dennis ;Kelly,Michael ;
CONTRACT: F19628-76-C-0017, DOT-FA70WAI-175
PROJ: 649E
MONITOR: ECAC,FAA-RD PR-75-074,76-200

UNCLASSIFIED REPORT

DESCRIPTORS: *Electromagnetic compatibility, *Airport radar systems, *Air traffic control systems, Frequency diversity, Frequency allocation, Dual channel, L band (U)
IDENTIFIERS: PE65704F (U)

The feasibility of introducing new dual-frequency-diversity radars (ARSR-3), which are designed to operate in the 1250-1350 MHz frequency band, into the present environment was investigated. The electromagnetic environment surrounding four sites was analyzed to determine the electromagnetic compatibility both before and after introduction of the ARSR-3 at each site. Frequency assignment techniques and other operational procedures necessary to maintain current levels of compatibility are identified. (Author) (U)

AD-A043 704 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Grissom AFB, Indiana. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 77 80P McCabe,Michael J. ;
REPT. NO. 77/66R-97

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control radar beacon systems, *Search radar, Test and Evaluation, Air traffic control systems, Radar tracking, Reliability, Performance(Engineering), Area coverage, Antenna radiation patterns, Air traffic control terminal areas, False targets (U)
IDENTIFIERS: AN/FPN-47, AN/TPX-42(V), Grissom Air Force Base (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations to the radar approach control (RAPCON) facility at Grissom AFB, Indiana. The data presented in this report were collected during the evaluation period 20-27 April 1977. The RAPCOM facility is comprised of an AN/FPN-47 airport surveillance radar (ASR), AN/TPX-42(V) Type III Air traffic control radar beacon system (ATCRBS), and associated power systems. This report includes descriptions of the useable radar coverage, radar coverage diagrams, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR and ATCRBS systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion or relocation of equipment or until a change occurs in the horizontal profile. (Author) (U)

AD-A043 030 17/7 17/2.1 20/14
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Communications Station Evaluation Report, Homestead AFB, Florida. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 77 91P Buford,Jimmy D. ;
REPT. NO. 77/66C-94

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, *Ground to air communications, Air to Surface, Antennas, Radio transmission, Electric power distribution, Very high frequency, Ultrahigh frequency, Altitude, Antenna radiation patterns, Ground controlled approach radar, Radio receivers, Radio transmitters (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Homestead AFB, FL (1942 Comm Sq) from 17 March through 28 March 1977. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF and UHF communications systems. Included in this report are the results and analysis of equipment checks, loop test line level diagrams for the GCA and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. The data and diagrams in this report can be used as guides for anticipated performance of the communications systems at Homestead AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. (Author) (U)

AD-A043 029 17/7 17/9 20/14
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Homestead AFB, Florida. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 77 95P Chaumont,Roderick C. ;
REPT. NO. 77/66R-93

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control radar beacon system, *Radar landing control, *Radar stations, Ground clutter, Wave propagation, Climate, Atmospheric refraction, Airport radar systems, Radar transmitters, Radar receivers, Radar antennas, Plan position indicators, Monitors, Tilt, Ground controlled approach radar (U)
IDENTIFIERS: AN/FPN-47 (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 16-28 March 1977 to define the capabilities and limitations of the fixed ground controlled approach (GCA) facility at Homestead AFB, Florida. The GCA is comprised of an AN/FPN-47 airport surveillance radar (ASR), AN/TPX 42(A)V Type III air traffic control radar beacon system (ATCRBS), AN/FPN-16 precision approach radar (PAR), and associated power and communications systems. This report includes descriptions of the useable ASR and PAR coverage and tracking capabilities, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR, ATCRBS, and PAR systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

AD-A042 846 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

A Flight Investigation of System Accuracies and Operational Capabilities of a General Aviation Area Navigation System. (U)

DESCRIPTIVE NOTE: Final rept. Jul-Sep 75,
JUN 77 99P Edmonds,Jack D. ;Pursel, Robert H. ;Gallagher,John ;
REPT. NO. FAA-NA-77-1
MONITOR: FAA-RD 77-43

UNCLASSIFIED REPORT

DESCRIPTORS: *Navigational aids, *Terminal flight facilities, *Air traffic control systems, Errors, Flight testing, Distance measuring equipment, Omnidirectional, Navigation computers, Four dimensional, Three dimensional, Two dimensional, Data processing, Flight paths (U)
IDENTIFIERS: VOR (U)

Flight tests were conducted at the National Aviation Facilities Experimental Center (NAFEC) using a general aviation area navigation (RNAV) system to investigate system accuracies and resultant airspace requirements in the terminal area. Issues investigated were total system error and error budget, flight technical error, turn anticipation, waypoint storage capacity, and results of typical operational maneuvers. Subject pilots for the test represented two distinct levels of experience. Subjects were also restricted to a one-, two-, or three-waypoint storage capacity for various flights. Statistical data are presented for the various error components making up the RNAV total system error. Various operational capabilities were also investigated and graphical data are presented for parallel offsets and turn anticipation. A two standard deviation of + or - 1.5 nmi was measured for total system crosstrack error in the terminal area. (Author) (U)

AD-A042 796 17/7
SYSTEMS CONTROL INC PALO ALTO CALIF

An Operational Evaluation of Flight Technical Error. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 75 448P Adams,R. J. ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA/RD 76-33

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Champlain Technology Industries, Vermont.
DESCRIPTORS: *Radio navigation, *Error analysis, *Air traffic control system analysis, Flight control systems, Flight instruments, Flight simulators, Turning flight, Air space, Air traffic control terminal areas, Automatic pilots (U)

The primary objective of this effort is to determine whether a one mile flight technical error is achievable in enroute and terminal area operations using various types of airborne RNAV equipment. Flight technical error (FTE) is evaluated using both controlled cockpit simulator and flight test experiments, as well as operational flight test experiments in the existing airspace environment. Due to the scope and magnitude of this particular component of the area navigation error budget, the method of approach in this analysis is to use a coordinated concept of data collection and experiment design in order to maintain a strict discipline concerning commonality of acquired data such that from one experiment complements and cross correlates with data from other FTE experiments. One primary element of the coordinated experimental investigations is to determine RNAV procedural and operational requirements and capabilities. FTE magnitude and its impact on airspace planning, RNAV system manufacturers, RNAV users and air traffic controllers is analyzed in the main text taking into account the following: RNAV equipment and display factors, FTE performance in turns, performance in parallel offset, delay fan and direct to maneuvers, effects of workload and airspace utilization. RNAV error budget element combination is also analyzed. (U)

AD-A042 679 17/7 9/3
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. VORTAC Station Evaluation Report, Wright-Patterson AFB, Ohio. Evaluation Period 15-21 March 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 77 15P Howard,Geoffry S. ;
REPT. NO. 77/66N-89

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *TACAN, *Landing aids, Very high frequency, Omnidirectional, Range(Distance), Radio transmission, Power equipment, Antenna radiation patterns, Air Force research (U)
IDENTIFIERS: TRACALS(Traffic Control Navigation Approach and Landing System), VORTAC (U)

This report presents the results of the 15-21 Mar 77 evaluation of the Wright-Patterson AFB AN/FRN-32A VORTAC and associated power systems. The evaluation was conducted to observe the facility in its installed environment and to determine its capabilities and limitations. Results show that the facility is capable of satisfying the users' requirements. Recommendations are made for improvements. The results obtained can be used as a guide to anticipated performance until there is a significant change in either ground equipment, siting, or screening. (Author) (U)

AD-A042 514 17/2.1 17/7
VERVE RESEARCH CORP ROCKVILLE MD

Study Requirements for an Integrated Air/ Ground Communications Facility. (U)

DESCRIPTIVE NOTE: Research and Development rept. Jun 75-Aug 76,
MAY 77 334P Hansen,John ;Webster,A. ;
Reynolds,B. ;
REPT. NO. VS-29
CONTRACT: DOT-FA75 WAI-570
MONITOR: FAA-RD 76-154

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, *Radio equipment, Surface to air, Air to surface, Very high frequency, Ultrahigh frequency, Integrated systems, Antenna radiation patterns, Reliability(Electronics), Switching, Control, Maintenance (U)

The structure, performance, maintenance, and versatility of FAA Air/Ground Communication facilities are evaluated, using a system approach to analyze requirements and costs. Guidelines have been developed by this study for effectively defining Air/Ground facilities to support present and future operations of the National Airspace System. As a primary example, an integrated OAKLAND ARTCC model is designed which consolidates its associated communication facilities, and is responsive to its operational and maintenance requirements. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A042 350 17/7 17/9 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Communications Station Evaluation Report, Patrick AFB, Florida 14 February-1 March 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 77 83P Wallachy,Bruce E. ;
REPT. NO. 77/66C-90

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Control Systems, *Communication and radio systems, *Radar landing control, *Radio stations, Radio receivers, Antenna radiation patterns, Ultrahigh frequency, Very high frequency, Squelch, Couplers, Radio transmission, Antennas (U)
IDENTIFIERS: TRACALS, AN/GRR-25, Signal strength (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Patrick AFB, Florida (2179 Comm Gp) from 14 February through 1 March 1977. The purpose of the evaluation was to define the capabilities and limitations of the communications system servicing the Radar Approach Control (RAPCON) and control tower. Included in this report are the results and analysis of equipment checks, system line level diagrams, line of sight coverage data, analysis of airborne measurements of signal strength, and plots of UHF and VHF radiation patterns. Other items which are discussed in this report and are common problems with most other systems include system alignment procedures, receiver audio output and squelch settings, receive coupler loss specifications, AN/GRR-25 frequency accuracy procedures, antenna maintenance, and frequency synthesizer outputs. A special investigation is also included that addresses the equipment and airborne tests for a frequency against which a complaint was filed. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications system at Patrick AFB, until there is an addition, (U)

AD-A042 325 17/7 20/14 17/2.1
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume V. Multipath Channel Characterization Test. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75, SEP 76 249P Thompson,A. D. ;Burreson, B. J. ;Rieder,P. F. ;Alexander,P. ;
REPT. NO. D6-44050
CONTRACT: DOT-TSC-707
MONITOR: FAA-RD,TSC 75-173-5,FAA-76-22-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 6, AD-A041 971.
DESCRIPTORS: *Air traffic control systems, *Communication satellites, *Multipath transmission, Oceans, L Band, United States, Doppler effect, Channels, Scattering, Autocorrelation, Fourier transformation, Grazing, Angles, Dela (U)
IDENTIFIERS: ATS 6 satellite, KC 135 aircraft (U)

Results of aeronautical L-band multipath channel characterization tests are given. All tests were conducted between September 1974 and April 1975 as part of the U.S. DOT aeronautical technology test program. These tests were part of the international Integrated ATS-6 L-Band Experiment coordinated by the NASA/Goddard Space Flight Center. Wideband PN-coded test signals transmitted from an FAA KC-135 jet aircraft were relayed by the ATS-6 satellite for reception by the satellite aeronautical channel prober (SACP) receiver located at the NASA/ Rosman ground station. Both oceanic and overland multipath data are analyzed to provide delay-Doppler characterizations of the channel. Specific anlaysis outputs presented include the delay-Doppler scatter function, delay spectra, Doppler spectra, frequency and time autocorrelation functions, spread parameter measures, total scattered intensity and time-domain statistics. Oceanic results are compared to expectation through the use of physical optics surface integration vector scatter model. (U)

AD-A042 320 1/2 17/7
OHIO UNIV ATHENS DEPT OF ELECTRICAL ENGINEERING

Instrument Landing System Improvement Program: Far-Field Monitoring. (U)

DESCRIPTIVE NOTE: Final rept. Oct 72-Jan 75. JAN 75 87P
REPT. NO. EER-5-21
CONTRACT: DOT-FA69WA-2066
MONITOR: FAA-RD,GIDEP 75-201,E089-2269

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument landings, *Air traffic control systems, *Glide slope, *Far field, Monitoring, Measurement, Modulation, Probes, Field intensity, Extrapolation, Linearity, Algorithms (U)
IDENTIFIERS: Difference in depth of modulation, ILS Glide slope angle (U)

Methods of far-field extrapolation monitoring of the ILS glide slope angle are investigated. The use of a quasilinearization algorithm to determine path angle and width from measurements below obstruction heights at the middle marker is described with results for various fault conditions tabulated. A precision space modulation quotient monitor (SMQ) for measuring high values of DDM at low signal levels is described. A description of investigations of a field strength monitor using the capture effect principle to sense changes in low altitude field strength caused by environmental effects is included. (Author) (U)

AD-A042 146 17/7 22/2 17/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume II. Demonstration of Satellite-Supported Communications and Surveillance for Oceanic Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-Apr 75, APR 76 90P Jefferson,Francis W. ;
REPT. NO. FAA-NA-75-64
MONITOR: FAA/RD 75/173-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A041 863.

DESCRIPTORS: *Air traffic control systems, *Communication satellites, *Data transmission systems, *Voice communications, L band, Simulation, Computer programs, Surveillance, Oceans (U)
IDENTIFIERS: ATS 6 satellites, ATS 5 satellites (U)

Demonstrations of satellite-supported communications for application to oceanic air traffic control (ATC) were conducted as part of an international ATS-6 L-band satellite test program. The ATC demonstrations were comprised of two phases: demonstrations conducted solely for United States (U.S.) Department of Transportation Federal Aviation Administration purposes and demonstrations conducted as a joint effort between U.S., European Space Agency (ESA), and Canada. Voice, data, and dependent surveillance communications between air traffic controllers at a ground terminal and pseudopilots in two airborne aircraft, FAA KC135 and ESA COMET IV, were performed via the ATS-6 satellite and Rosman ground station. A simulated aircraft terminal located at Rosman was also employed. Each terminal provided up to six simulated data link aircraft, through computer software, for traffic loading purposes. Canada provided a voice-only simulated aircraft terminal located in Ottawa. (U)

AD-A042 129 1/2 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. ILS Station Evaluation Report, Luke AFB, AZ, Auxiliary 1. (U)

DESCRIPTIVE NOTE: Final rept., 77 64P Barnhart,Kathryn Y. ;
REPT. NO. 77/66N-88

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Instrument landings, *Air traffic control systems, Antennas, Logistics support, Radio transmission, Electric power distribution, Electric power production, Electric generators, Standing wave ratios (U)
IDENTIFIERS: AN/MRN-7, AN/MRN-8 (U)

This evaluation report presents data collected and analyzed to define the capabilities and limitations of the Luke AFB, Auxiliary 1, ILS (AN/MRN-7/8) and its associated power system. The ground evaluation phase was conducted 4-10 Feb 1977, and the flight evaluation was conducted from 11-14 Feb 1977. Detailed results of the ground equipment checks and the airborne evaluation are included. These results indicate that this facility is fully capable of providing satisfactory service. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment, the horizon screening, or terrain. (U)

AD-A042 030 17/2.1 17/7 1/5
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Communications Station Evaluation Report Bitburg AB, Germany. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 77 93P Jones,Robert L. ;
REPT. NO. 77/68-C-20

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRACALS Evaluation report.
DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, *Ground to air communications, Very high frequency, Ultrahigh frequency, Landing aids, West Germany, AN/GRR-24, Operational test and evaluation (U)
IDENTIFIERS: *Air to ground communications, AN/GSA-135, Tracals project (U)

A Traffic Control and Landing System (TRACALS) Communication Station Evaluation was performed at Bitburg AB, Germany, 7-18 January 1977. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications system. Included in this report are results and analyses of equipment checks, loop test line level diagrams for the GCA and control tower systems, and line-of-sight coverage data and analysis of airborne measurements. Also included are discussions on the AN/GRR-24 receiver output levels, measurement of transmitter modulation, and adjustment of the regulated output amplifiers (ROA) on the AN/GSA-135 Control Tower Console. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communication system at Bitburg AB until there is an addition, deletion, relocation of equipment, or change in the horizon profile which would affect the system. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A041 971 17/7 17/2.1
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume VI. Modem Evaluation Test. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75,
SEP 76 154P Wilson,S. G. ;Paulson,C. V. ;Reese,I. R. ;
REPT. NO. D6-44051
CONTRACT: DOT-TSC-707
MONITOR: FAA-RD,TSC 75-173-6,FAA-76-22-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 7, AD-A041 862.
DESCRIPTORS: *Air traffic control systems, *Communication satellites, *Modems, Data rate, Speech transmission, Range finding, Aircraft antennas, L band, Errors, Intelligibility, Accuracy, Signal to noise ratio, Multipath transmission, Jet transport planes, North Atlantic Ocean (U)
IDENTIFIERS: ATS-6 satellite, KC-135 aircraft, C-135 aircraft, Aerosat satellites (U)

Results of performance evaluation of voice, digital data and ranging modems in the aeronautical satellite environment are given. Approximately 80 hours of modem performance data were acquired on board an FAA KC-135 jet aircraft operating over the North Atlantic. L-band test signals received at the aircraft were generated by ATS-6 satellite relay of transmissions from a NASA ground station. The modem evaluation tests were conducted between September 1974 and April 1975 as part of the U.S. Department of Transportation (DOT) aeronautical technology test program. The U.S. DOT tests were a component of the International ATS-6 L-Band Experiment coordinated by the NASA/Goddard Space Flight Center. Measured modem performance includes: the word intelligibility achieved by four distinct speech transmission modems; the average bit-error probability and error patterns associated with five phase-shift-keyed 1200-bps data modems; and the rms ranging accuracy achieved with two ranging modems. (U)

AD-A041 864 9/5 17/7 22/2
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume IV. Data Reduction and Analysis Software. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73 to Dec 75, SEP 76 214P Thompson,A. D. ;Wilson,S. C. ;Rieder,P. F. ;Chu,W. L. ;Mardesich,M. J. ;
REPT. NO. D6-44049
CONTRACT: DOT-TSC-707
MONITOR: FAA RD 75-173-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 6, AD-A041 971.
DESCRIPTORS: *Aircraft antennas, *Air traffic control systems, *Scientific satellites, *Communication satellites, Signal to noise ratio, Multipath transmission, Modems, Digital systems, Fast Fourier transforms Algorithms, Envelope(Space), Scattering, Detectors, Data processing, Computer programs (U)
IDENTIFIERS: ATS-6 satellite (U)

Software used for the reduction and analysis of the multipath prober, modem evaluation (voice, digital data, and ranging), and antenna evaluation data acquired during the ATS-6 field test program is described. Multipath algorithms include reformatting operations, delay-spectra time histories, delay-Doppler scatter function S(Tau, Omega), noise determination and removal, spread calculations, airborne tape analysis, and other detailed processing including time-domain analysis and various integral and Fourier operations on S(Tau, Omega). Modem and antenna evaluation data processing software includes algorithms for the determination of (1) C/N sub o and multipath interference ratio, S/I, (2) digital data bit-error rates, block error statistics, and inter-error spacing, and (3) ranging error statistics and distribution. Sample outputs are given. Program listings and other information are provided in an auxiliary software data package. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A041 863 9/5 17/7 22/2
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume III. Summary of U. S. Aeronautical Technology Test Program. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75, SEP 76 203P Schroeder,E. H. ;Sutton,R. W. ;Thompson,A. D. ;Wilson,S. G. ;Kuo,C. J. ;
REPT. NO. D6-44048
CONTRACT: DOT-TSC-707
MONITOR: FAA-RD 75-173-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Errata sheet inserted. See also Volume 4, AD-A041 864.
DESCRIPTORS: *Aircraft antennas, *Air traffic control systems, *Communication satellites, Signal to noise ratio, Intermodulation, L band, Phased arrays, Slot antennas, Dipole antennas, Gain, Noise(Radio), Insertion loss, Strip transmission lines, Multipath transmission, Antenna radiation patterns, Doppler effect, Scattering, Errors, Voice communications (U)
IDENTIFIERS: ATS-6 satellite, KC-135 aircraft (U)

The U.S. Department of Transportation (DOT) program for air traffic control (ATC) experimentation and evaluation with the ATS-6 satellite was part of the Integrated ATS-6 L-Band Experiment. This overall experiment was coordinated by the NASA/Goddard Space Flight Center and was international in scope, involving several participants. All tests were performed between September 1974 and April 1975. The U.S. DOT aeronautical program consisted of both ATC communications demonstration and technology tests. Tests were in support of the aeronautical satellite (AEROSAT) program to collect satellite-aircraft signal propagation data, evaluate L-band avionics hardware designs, and perform preliminary satellite voice and data communications demonstration tests. All tests were conducted between the FAA KC-135 aircraft and the NASA-Rosman ground station via the geostationary ATS-6 satellite. (U)

AD-A041 862 9/5 17/7 22/2
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite. Volume VII. Aircraft Antenna Evaluation Test. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75,
SEP 76 81P Kuo,C. J. ;Schroeder,E. H. ;Stapleton,B. P. ;
REPT. NO. D6-44052
CONTRACT: DOT-TSC-707
MONITOR: FAA-RD 75-173-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Errata sheet inserted. See also Volume 3, AD-A041 863.
DESCRIPTORS: *Aircraft antennas, *Air traffic control systems, *Communication satellites, *Phased arrays, L band, Gain, Noise(Radio), Insertion loss, Slot antennas, Dipole antennas (U)
IDENTIFIERS: ATS-6 satellite, Quad helix (U)

Aircraft L-band antennas designed for satellite communication were evaluated using an FAA KC-135 aircraft and the NASA ATS-6 satellite. All tests were performed between September 1974 and April 1975 as one component of the U.S. DOT/FAA aeronautical technology tests. The U.S. DOT/FAA test program was part of the international ATS-6 L-Band Experiment. Three antenna systems were evaluated: (1) a three-element slot-dipole system with antennas mounted on the top and on either side, (2) a microstrip phased array with steerable beam in the roll plane, and (3) a 'patch' consisting of a single microstrip element. Antenna performance was evaluated during controlled overocean flight. Data was acquired for a range of satellite elevation angles between 10 and 40 deg. Two RF receiving channels were used to allow simultaneous reception of data for two antennas. Antenna gain and S/I (the ratio of direct signal to multipath interference) as a function of aircraft/satellite geometry were determined by off-line analysis and presented in the form of plots and tabulations. The report consists of seven volumes: (U)

AD-A041 336 1/5 5/9 17/9
METIS CORP ALEXANDRIA VA

Training Impact of ARTS III Enhancements, (U)

DEC 76 53P Willis,K. ;
CONTRACT: DOT-FA77WA-3930
MONITOR: FAA-AVP 77-18

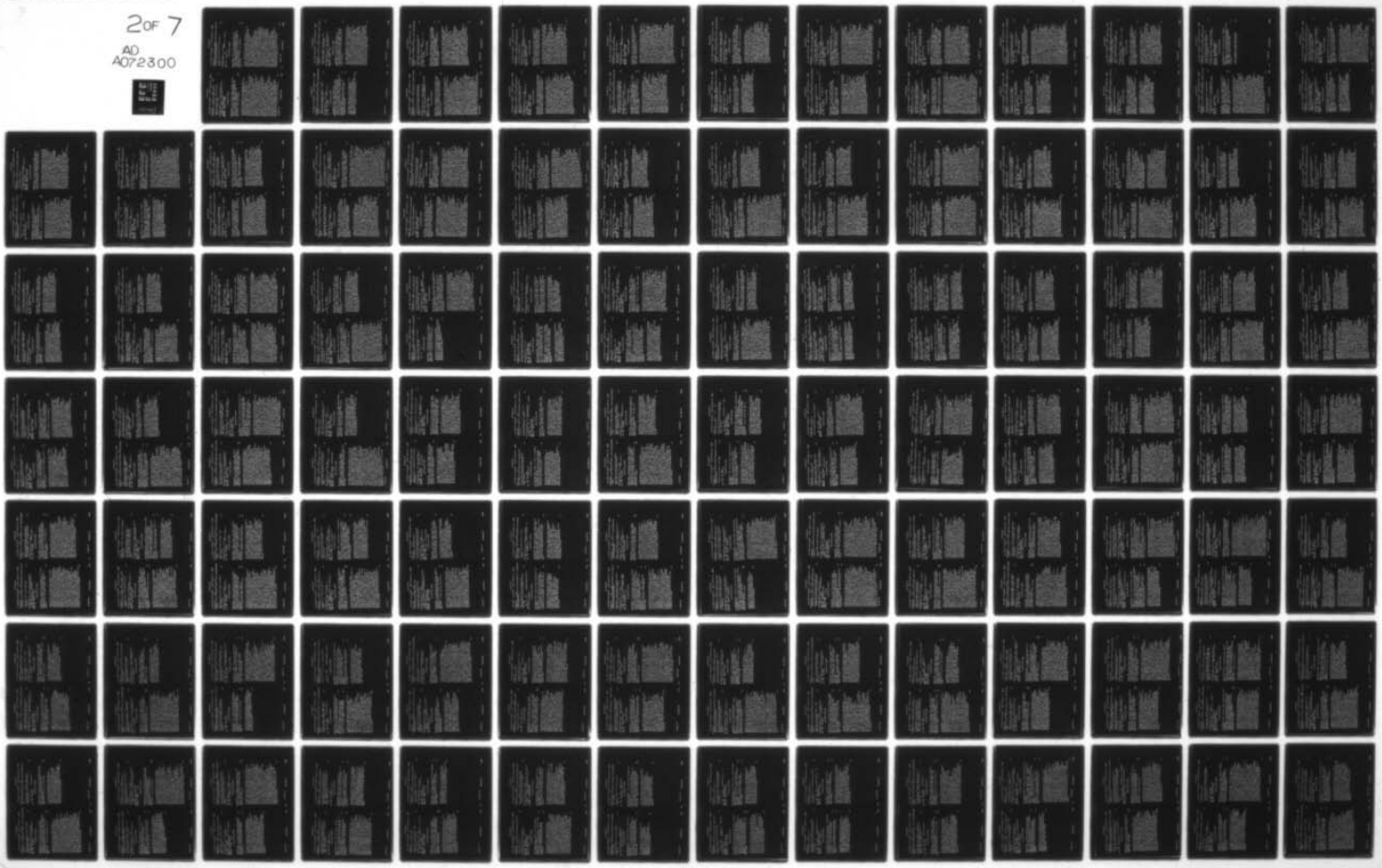
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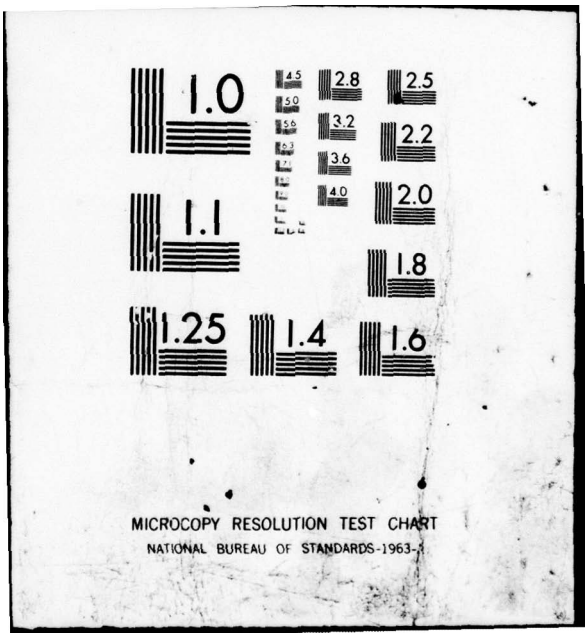
DESCRIPTORS: *Air traffic control systems, *Air traffic controllers, *Training devices, *Radar equipment, Radar tracking, Radar operators, Productivity, Automation, Aviation safety, Display systems, Teaching machines (U)
IDENTIFIERS: ARTS(Automated Radar Terminal System), Automated radar terminal system, Radar simulators (U)

This document examines the productivity gains attributed to the ARTS-III Enhancement program. Fundamental is the question of the impact of productivity gains upon the air traffic controllers' training needs. A detailed productivity analysis of ARTS-III Enchancement was conducted with and without training considerations. The analysis indicated a 0.8 percent reduction in benefits due to training requirements. The training impacts of the productivity gains shown considered the entire training cycle, including the facility on-the-job training (OJT) which was the most affected area. In addition to the principal analysis, the effectiveness of an alternate training aid (radar simulator) was examined. (Author) (U)

AD-A072 300 DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA F/G 1/2
AIR TRAFFIC CONTROL SYSTEMS.(U)
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AD-A041 324 17/7 1/5 13/1 20/6
RAYTHEON CO SUDBURY MASS EQUIPMENT DIV

Boston Air Route Traffic Control Center (ARTCC) Lighting Study. (U)

DESCRIPTIVE NOTE: Final rept. Apr-Nov 76,
MAY 77 58P Hall,Charles M. ;Carr, Richard M. ;Kopala,Alan J. ;
CONTRACT: DOT-FA76WA-3738
MONITOR: FAA-RD 76-203

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Control centers, *Display systems, *Light sources, Air traffic controllers, Human factors engineering, Lighting equipment, Faceplates, Light, Illumination, Glare, Reflection (U)
IDENTIFIERS: Plan view displays (U)

This report describes the work accomplished in reducing reflections on the faceplates of the Plan View Displays (PVDs) while increasing the level of ambient lighting, at Test Area D of the Boston ARTCC control room. This was intended, respectively, to improve the observation of PVD flight data by the air traffic controllers, and to facilitate reading and walking in the immediate aisle area. Raytheon lighting experts identified glare and reflection sources and lighting deficiencies, measured their various intensities with photometric test equipment, and provided practical suggestions to rectify the lighting problems. Their technical investigation, supplemented by extensive treatises on the optical definition and a literature review of the subject lighting reflection dilemma, was consolidated in a separate Raytheon Report and is attached to this FAA report. NAFEC engineered the lighting and equipment modifications advised by Raytheon. NAFEC human factors personnel surveyed the controller's opinions of the changes in the control room. Their work and findings are briefly described in this report. Details can be obtained in NAFEC Report No. FAA-RD-77-50. The results of this project were the significant reduction of the PVD reflections and glare, and an increase in the ambient illumination, at the test location in Area D. (U)

AD-A041 299 17/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Surveillance and Data Link Enhancement Program. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 37P Koenke,E. J. ;Garot,J. M. ;
REPT. NO. FAA-EM-77-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Data links, *Surveillance, *Air traffic control systems, Approach, Computer programming, Computerized simulation, Elevation, Azimuth, Range finding, Algorithms, Kalman filtering, Tracking (U)
IDENTIFIERS: Trilateration, Parametric sensitivity (U)

The Air Traffic Control system is moving toward more sophisticated levels of automation in an effort to increase safety and reduce system cost. National Airspace System (NAS), Automated Radar Terminal System (ARTS), Conflict Alert, Discrete Address Beacon System (DABS) and Intermittent Positive Control (IPC) are examples of this trend. Fundamental to the success of the highly automated ATC system anticipated in the year 2000 and beyond is the ability of the system to perform automatic conflict detection and resolution. The key areas effecting this performance are surveillance system measurement accuracy and tracking capability in a variety of airspace environment and densities. This has been recognized by both the DGAC and the FAA and for this reason the following cooperative program has been developed. A variety of surveillance sensors have been postulated for air traffic control application. Among these are DABS, AGDLS, Satellite systems and combinations of sensors. These systems differ in the type of measurement, measurement accuracy and measurement rate. (Typical measurement types are range, azimuth altitude systems; range, azimuth, elevation systems; trilateration systems, etc.) (U)

AD-A040 767 17/7 1/4 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

VORTAC Station Evaluation Report, Edwards AFB, CA (6-19 December 1976). (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 76 110P Clark,Allen D. ;
REPT. NO. 76/66N-85

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: TRACALS evaluation report.
DESCRIPTORS: *Radio navigation, *Landing aids, *Tacan, *Ground stations, Instrument landings, Ground controlled approach radar, Navigational aids, Air Traffic control systems, Sites, Operational test and evaluation (U)
IDENTIFIERS: Approach systems, Control towers, Terrain screening, Edwards Air Force Base, AN/GRN-20C, AN/FRN-38 (U)

This report presents of the 6-19 December 1976 evaluation of the Edwards AFB AN/GRN-20C TACAN, AN/FRN-38 VOR, and their associated power systems. The evaluation was conducted to observe the facility in its installed environment and determine its capabilities and limitations. (U)

AD-A040 759 1/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Longitudinal Separation Analysis of the Central East Pacific Track System. (U)

DESCRIPTIVE NOTE: Final rept. Dec 73-Jun 74,
JUN 77 109P Smoot,Wayne E. ;
REPT. NO. FAA-NA-76-39
MONITOR: FAA-EM 77-3

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Air traffic control systems, *Collision avoidance, *Aviation safety, Aircraft, Flight paths, Separation, Mach number, Inertial navigation, Collisions, Risk analysis, Pacific Ocean, Overseas (U)

This report represents an evaluation of aircraft mach number spacing and inertial navigation systems (INS) as regards their impact on longitudinal separation and collision risk in the Central East Pacific (CEP). A nomograph was produced for predicting maximum expected changes in longitudinal separation of aircraft flying with mach number spacing on long-distance transoceanic flights. Results indicate that a statistically significant difference in maintaining longitudinal separation exists between those aircraft employing mach number spacing techniques and those not using the techniques, and likewise between aircraft with more sophisticated air data systems than those without. Collision risk from loss of longitudinal separation was found to be at an acceptable level, both in the old and current CEP systems. (Author) (U)

AD-A040 665 17/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Test and Evaluation of the Dallas/Fort Worth Terminal Communications Switching System. (U)

DESCRIPTIVE NOTE: Final rept. May-Jun 75, NOV 76 78P Cleary,Richard W. ;Spingola, Anthony ;Karovic,Stephen A. ;Hinely,P. E. , Jr;
REPT. NO. FAA-NA-75-61
MONITOR: FAA-RD 76-111

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication switching centers, *Air traffic control systems, *Air traffic control radar beacon system, *Frequency division multiplexing, Communications traffic, Operational test and evaluation, Safety (U)

This report details the operational and technical evaluation of the air traffic control (ATC) terminal communications switching system (TCSS) at the Dallas/Fort Worth Tower/TRACON (Terminal Radar Approach Control) facility by personnel from the National Aviation Facilities Experimental Center. The system was designed and built for the Federal Aviation Administration and is innovative in that it uses frequency division multiplexing techniques for ATC instead of conventional communication-channel separation methods. The following are other TRACON communication innovations: communications are carried over a single coaxial cable in the 10-MHz to 15-MHz band; solid state logic circuitry is used for electronic switching of voice and radio-remoting interconnections; positional communications reconfiguration is under processor control; and all direct access keys and radio-select keys use light-emitting diodes for designators. In addition to a technical evaluation of equipment performance, an evaluation of the ATC operational performance of the TCSS was conducted using facility personnel as test subjects. Responses on questionnaires completed by the test subjects indicated that, with minor exceptions, the system satisfies requirements.(U)

AD-A040 645 17/9 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report Patrick AFB, Florida, 14-28 February 1977. (U)

DESCRIPTIVE NOTE: Final rept., JUN 77 121P Pinney,Earl T. , Jr;
REPT. NO. 77/66R-89

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control systems, *Airport radar systems, Aircraft landings, Test and evaluation, Search radar, Approach, Air traffic control radar beacon system (U)
IDENTIFIERS: *AN/FPN-47, *AN/TPX-42A(V), *AN/FPN-16, TRACALS Project, Traffic control and landing systems (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 14-28 Feb 77, to define the capabilities and limitations of the radar approach control (RAPCON) facility at Patrick AFB, Florida. The RAPCON is comprised of the AN/FPN-47 airport surveillance radar (ASR), the AN/TPX-42A(V) Type 3 air traffic control radar beacon system (ATCRBS), the AN/FPN-16 precision approach radar (PAR), and the associated power systems. The report includes a description of the useable ASR coverage, a description of the ATCRBS coverage and tracking capabilities, a description of the PAR coverage and tracking capabilities, and the analysis of flight and equipment performance data. The capabilities and limitations presented are a guide for expected system performance until there is a modification to or relocation of the equipment or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A040 472 17/9 17/7 1/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Comparison of the Performance of the Moving Target Detector and the Radar Video Digitizer. (U)

DESCRIPTIVE NOTE: Project rept.,
APR 77 90P O'Donnell,R. M. ;
Cartledge,L. ;
REPT. NO. ATC-70
CONTRACT: F19628-76-C-0002
MONITOR: FAA/RD 76-191

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Moving target indicators, *Signal processing, Aircraft detection, Radar clutter, Video signals, Radar signals, Digitizers, Doppler systems, Air traffic control systems, Adaptive systems, Threshold effects (U)

Results of side by side simultaneous tests to compare the performance of the Moving Target Detector (MTD) digital signal processor and that of a newly developed adaptive sliding window detector, the Radar Video Digitizer (RVD-4), are described. The MTD, used with a highly modified FPS-18, employs coherent linear doppler filtering, adaptive thresholding, and a fine grained clutter map which together reject all forms of clutter simultaneously. The RVD-4, which was used with an ASR-7, is a non-linear, non-coherent digital processor. The detection and false alarm performance of both processors in thermal noise was identical. Measured detection and sub-clutter visibility performance of the MTD on controlled aircraft flying in heavy rain, in heavy ground clutter, and at near-zero radial velocity is shown to be superior to that of the RVD-4. MTD report data is also shown to be more accurate than the RVD-4 data resulting in improved ARTS-III tracker performance when using MTD processed data. (Author) (U)

AD-A040 389 17/7 14/1
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Estimation of UG3RD Costs. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 117P Reck,Robert ;O'Brien,A. ;
Adil ,A. ;Rempfer,D. ;Benjamin,W. ;
REPT. NO. TSC-WP-420-C4-17
MONITOR: FAA-AVP 77-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic control systems, Cost analysis, Automation, Airports, Commercial aviation, Discrete address beacon systems, Wake, Vortices, Position location reporting system, Avoidance, Aviation accidents, Cost estimates (U)

The study estimates the additional costs that would be incurred by both the FAA and airport and airway users as a result of implementation of the Upgraded Third Generation Air Traffic Control System (UG3RD). Annual cost estimates are provided for engineering and development, facility and equipment expenditures, and maintenance expenses for the period 1976 through 2000. Separate cost detail is provided for the Discrete Address Beacon System, Intermittent Position Control, Control Automation, and the Wake Vortex Avoidance System. These components, in various combinations, have been evaluated as part of a cost-benefit analysis of the UG3RD system. In addition, certain unit costs were extimated for use in valuing potential UG3RD benefits. These costs consisted of the value of passenger time, aircraft operating costs, and the costs of aviation accidents and fatalities. (Author) (U)

AD-A040 358 17/7 1/2 17/2
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

TRACALS Evaluation Report. TACAN Station Evaluation Report. Torrejon AB, Spain, 9-21 June 1976, 26 October-2 November 1976. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 77 88P Collier,John D. ;
REPT. NO. 76/68-T-19

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Air traffic control systems, *TACAN, *Aircraft landings, AN/GRN-19A, Power equipment, Propagation, Climate, AN/GRA-111, Test and evaluation, Profiles, Errors (U)
IDENTIFIERS: TRACALS Project, Traffic control and landing systems (U)

This Traffic Control and Landing Systems (TRACALS) station evaluation report presents the results of data collected to define the capabilities and limitations of the Tactical Air Navigation (TACAN) system, AN/GRN-19A, with an AS-686 antenna and associated power equipment at Torrejon Air Base, Spain, during 9-21 June/26 October - 2 November 1976. The report defines the theoretical coverage limits of the TACAN within its siting environment. The airborne evaluation results are presented to show azimuth and DME accuracy, the extent of usable coverage, the interference field pattern and the quality of course structure. Additionally, an analytical study on relationship of antenna height to null location is presented. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or until a change occurs in the horizon screening. (Author) (U)

AD-A040 153 1/2 17/7
SYSTEMS CONTROL INC PALO ALTO CALIF

Area Navigation Route Width Requirements. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 76 118P Stephenson,A. R. ;Clark,W. H. ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA/RD 77/21

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Flight paths, *Air space, Width, Routing, Air traffic, Civil aviation, Boundaries, Utilization (U)
IDENTIFIERS: Area navigation (U)

This report presents the results of a study to determine if a requirement exists for reduced route widths in the National Airspace System. The basis for this investigation was the recommendation by the FAA/Industry RNAV Task Force that provision be made for constant and reduced route widths in order to handle the anticipated growth in air traffic by allowing more routes in the same airspace and less restriction on application of parallel offsets. The recommendation included a reduction of high altitude route widths from + or - 4.0 nm in the 1977-1982 period to + or - 2.5 nm in the post-1982 period. Route width requirements for both high altitude enroute and terminal areas are quantified, based on the impact of route width on route efficiency, airspace capacity, and route length. Results of this study, which are based on analysis of specific, high traffic demand geographical areas, indicate that there is a requirement to eliminate the current splayed route widths and provide constant width routes, but that there is no requirement for reduction of route widths below a constant + or - 4 nm in the high altitude enroute structure, or below the + or -2 nm or + or -4 nm, dependent upon distance from the VORTAC, which are currently required in the terminal area. (Author) (U)

AD-A040 060 17/7 5/3
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Automation Program Cost-Benefit Analysis. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 76 54P Broglio,Carlo J. ;Hannan, Thomas L. ;
REPT. NO. FAA/RD-77/53

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Cost analysis, Automation, Cost benefits, Air traffic, Energy consumption, Air pollution, Airports, Aircraft noise, Life cycle costs (U)

This report contains an analysis of the benefits and costs associated with the Central Flow Control Automation Program. It presents the projected benefits and costs of both the current system and proposed system in terms of present-value dollars. Resultant benefit and cost differentials are discussed in terms of net present value and benefit-to-cost ratio. The sensitivity of these measures to major program uncertainty is described. (Author) (U)

AD-A039 996 17/7 17/2 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report, Dover AFB, Delaware, 18-28 January 1977. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 77 86P Buford,Jimmy D. ;
REPT. NO. 77/66C-87

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication equipment, *Aircraft landings, Radio equipment, Antenna radiation patterns, Line of sight, Very high frequency, Ultrahigh frequency, Test and evaluation (U)
IDENTIFIERS: *TRACALS project, *Communication stations (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Dover AFB, DE (2016 Comm Sq) from 18 January through 28 January 1977. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications systems. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the RAPCON and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of VHF/UHF radiation patterns. The data and diagrams in this report can be used as guides for anticipated performance of the communications system at Dover AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented are valid for other locations using the same communications equipment. (Author) (U)

AD-A039 991 17/7 17/2 1/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TACAN, VOR, and ILS Station Evaluation Report, Osan AB, Korea. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept. (Final) 15 Oct-22 Nov 76,
MAY 77 197P Nix,Paul W. ;
REPT. NO. 76/66N-82

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Instrument landings, *TACAN, *Glide slope, *Radio navigation, Test and evaluation, Power, Data processing (U)
IDENTIFIERS: *TRACALS project, *VOR, *Localizers, AN/MRN-8A, AN/MRN-20B, AN/MRN-7A, AN/FRN-37 (U)

This evaluation report presents data collected and analyzed to define the capabilities and limitations of the Osan AB TACAN (AN/GRN-20B), VOR (AN/FRN-37), Localizer (AN/MRN-7A), and their associated power systems. The evaluation of the Glide Slope (AN/MRN-8A) let to its removal from service. The reasons for this action and the equipment's performance information is included for historical purposes. The ground evaluation phase was conducted 16-24 October and the flight evaluation from 24-30 October. Additional flight evaluation of the Glide Slope was conducted from 8-11 November and again from 18-21 November. These results indicate that all the facilities evaluated, except the Glide Slope, are fully capable of providing satisfactory service. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in ground equipment or in horizon screening. (Author) (U)

AD-A039 483 1/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airline Delay Trends, 1974-1975. A Study of Block Time Delays, Ground and Airborne, for Scheduled Air Carriers. (U)

DESCRIPTIVE NOTE: Annual rept.,
MAR 77 218P Condell,Helen M. ;Horowitz, Seymour M. ;Kaprelian,Alan S. ;
REPT. NO. TSC-FAA-77-6
MONITOR: FAA-EM 77-2

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: See also Rept. no. FAA-EM-74-11-Vol-1, AD-A015 870.
DESCRIPTORS: *Commercial aviation, *Air traffic control systems, Delay, Scheduling, Time, Arrival, Flight paths, Airports, Data bases, Statistical data (U)

Estimates of block, airborne and ground delays for route segments flown by United States domestic scheduled airlines operating out of twenty large airports are presented in this document. The data were determined from the CAB ER-586 Service Segment data base, which provides monthly operational times, both ground and airborne, for all route segments receiving scheduled air carrier service. The data in this report are limited to the three-hundred and thirty route segments connecting the twenty airports included in the study. Average monthly estimates of the ground and airborne components of block delays, defined as delays encountered from 'ramp to ramp' on a route segment, are presented for the two-year period from 1974-1975. Average monthly estimates of delays for the airborne portion of the segment ('wheel off' to 'wheels on') are categorized according to (1) route segment, (2) airline, (3) aircraft type and (4) local scheduled arrival or departure time. Average monthly estimates of delays for the ground portion of the route segments are categorized according to departure and arrival ground times at the twenty airport locations included in the study. (U)

AD-A039 225 17/7 1/2
SYSTEMS CONTROL INC PALO ALTO CALIF

Implementation of Area Navigation in the National Airspace System: An Assessment of RNAV Task Force Concepts and Payoffs. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 76 481P Clark,W. H. ;Bolz,E. H. ;Solomon,H. L. ;Stephenson,A. R. ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA-RD 76-196

UNCLASSIFIED REPORT

DESCRIPTORS: *Navigation, *Civil aviation, *Air traffic control systems, *Commercial aviation, Navigational aids, Economic analysis, Avionics, Aeronautics, Air traffic, Routing, Flight paths (U)
IDENTIFIERS: *Area navigation, *Air navigation, Volumetric navigation, National airspace system (U)

This document presents the results of a three year study effort to define the cost and operational impact, and to assess the economic benefits which are expected to accrue to the ACT system and various users of the National Airspace System as a result of the implementation of Area Navigation. Previous impact analyses are expanded to include the primary aspects of ATC system operation and to include a broad spectrum of user groups, route structure, and types of operation. System impact results are presented pertaining to slant range effects, VORTAC requirements, ATC automation, airspace capacity, route development, charting, flight inspection, VNAV, controller training, and controller productivity. User impact results are presented in terms of fuel and time increment benefits for several classes of users, comparing 2D RNAV to VOR in the high and low altitude structures, and comparing 2D, 3D, and 4D RNAV to VOR/radar vectors in the terminal area. Estimates are made of total annual savings due to RNAV, and an analysis of user equipment cost versus benefits is presented. The results of the user and system impact analyses, together with results of related system studies in the areas of avionics standards, waypoint standards, route designs, (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 875 17/7 9/2
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX

Computer-Program for FAA/ATCRBS Tape Reader, Program JASPER I. (U)

DESCRIPTIVE NOTE: Final rept. Oct 74-1 May 76,
MAR 77 72P Wetherbe,Mead ;Moulds, William J. ;
REPT. NO. AFWL-TR-76-219
PROJ: 9991
TASK: 00

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Air traffic control radar beacon system, *Computer programs, Punched tape, Reading machines, Machine coding, Radar beacons, False targets, Interrogators, Data processing, FORTRAN, Digital computers, Subroutines, Flow charting (U)
IDENTIFIERS: *Tape readers, Jasper 1 computer program, CDC 7600 computers, WUAFWL99910013, PE62610F (U)

This report presents an AFWL modified computer code, JASPER, which combines two computer codes originally developed by MIT Lincoln Laboratories. JASPER automatically identifies reflecting surfaces which cause false targets in the Air Traffic Control Radar Beacon System (ATCRBS), and determines their positions and orientation. The code is presently capable of processing data extracted from ARTS-3 terminal area processing systems. An explanation of the code is provided and a sample problem is included so that the user may become familiar with the input data and the flexibility of the output list. A later version of JASPER in close to ANSI FORTRAN has been written. This verison can be easily adapted to use on most computers. Data unpacking is done without the use of SHIFT or MASKING expressions. JASPER is written in FORTRAN version 3.4.4 (SCOPE) for the CDC 7600 computer. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 850 17/2.1 20/14 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of Very High Frequency Interference Cancellation System. (U)

DESCRIPTIVE NOTE: Final rept. Feb-Aug 76,
MAR 77 47P Santora,Charles G. ;
REPT. NO. FAA-NA-76-44
MONITOR: FAA-RD 77-15

UNCLASSIFIED REPORT

DESCRIPTORS: *Cancellation, *Radiofrequency interference, *Coupling circuits, *Air traffic control systems, Radio transmitters, Radio receivers, Phase shift circuits, Amplitude, Taps, Ground stations, Very high frequency (U)
IDENTIFIERS: *Interference cancellers, *Combiners (U)

This report describes a device to be used at sites, such as remote center airground facilities (RCAG's) and Flight Service Stations (FSS's) to counteract the interference due to reception of strong signals from collocated transmitters. The interference cancellation system unit tested handled up to four interfering transmitters and was found to perform as specified and reduce received interfering signals at power levels up to + 10 decibels referred to 1 milliwatt (dBm) down to at least-45 dBm. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 847 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C INFORMATION AND STATISTICS DIV

Current Aviation Statistics. Air Traffic Activity. Terminal Area Relationships. Fiscal Year 1976, (U)

MAR 77 59P Thompson,George E. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A032 605.
DESCRIPTORS: *Commercial aviation, *Terminal flight facilities, *Air traffic control terminal areas, Flight, Diurnal variations, Statistical data, Tables(Data) (U)

The current study of terminal area airport operations encompasses FY 1976 data for 415 airports at which FAA traffic control towers operated the entire twelve months period. These are presented in two primary groups: Air Commerce Airports, and General Aviation Airports. Each tower is requested to report the peak daily traffic count during the previous twelve months for air carrier, itinerant (including air carrier), total aircraft (including local) and instrument operations. Peak counts for the various categories need not occur on the same day. These peak days can be accurately identified from the daily traffic counts recorded on FAA Form 7230-1. Busy hour estimates are obtained from periodic counts 60 minutes in duration. These counts are made during known high activity periods of each traffic category. From this sample, tower personnel select a count which is representative of daily busy hour activity for each category. The tables contain traffic estimates for each airport at which an air traffic control tower operated furing all of FY 1976. Provided with peak day and busy hour are average day and hour operations computed from annual operations. Measures of peaking characteristics are given by the ratios of peak day to average day and busy hour to average hour for individual airports and airport size groups. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 723 17/7 12/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

UG3RD Baseline and Implementation Scenario. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 75 197P
REPT. NO. FAA-AVP-77-19

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control system analysis, *Operations research, Third generation computers, User needs, Forecasting, Scheduling, Terminal flight facilities, Commercial aviation, Military aircraft, Domestic, Foreign, Airport control towers, Airport radar systems, National transportation system, International relations, Regulations, Economics (U)

The Baseline and Implementation Scenario Describes the environment within which the Upgraded Thrid Generation (UG3RD) Air Traffic Control System components may be expected to operate. This environment is described by such parameters as forecast demands, aircraft characteristics and distribution, and airport configurations and locations. It also includes considerations of implementation such as establishment criteria, funding services, establishment strategies, and scheduling. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 659 17/7 5/5 1/5 5/8
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Impact of Automation upon Air Traffic Control System Productivity/Capacity (ARTS III). (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 76 39P Kuhar,William T. ;Gavel, Paul ;Moreland,James A. ;
REPT. NO. FAA-RD-77-39

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic controllers, *Job analysis, *Human factors engineering, Man machine systems, Automation, Airport radar systems, Work measurement, Capacity(Quantity), Productivity, Air traffic, Civil aviation (U)

This report documents the results of a study to assess the impact of the Automated Radar Terminal System (ARTS 3) upon air traffic control system capacity. It is based upon on-site measurements of air traffic activity, controller work pace, controller workload indicators, and staffing at the San Antonio, Texas and San Francisco/ Oakland, California TRACONS. Measurements were taken of both the pre-ARTS 3 and post-ARTS 3 environments and comparisons made to determine the direction and degree of change attributable to ARTS 3. The results indicate that direction and degree of change attributable to ARTS 3. The results indicate that the ARTS 3 system has reduced controller workload and increased system capacity by 10.5%. A reasonable estimate of the productivity increase is 8.5%. (Author) (U)

AD-A038 623 17/7 5/5 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Area Navigation/Vertical Area Navigation Terminal Simulation. (U)

DESCRIPTIVE NOTE: Final rept. Aug-Nov 75,
MAR 77 121P Crimbring,William ;Maurer, John ;
REPT. NO. FAA-NA-76-28
MONITOR: FAA-RD 76-211

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Navigation, *Job analysis, *Human factors engineering, Digital simulation, Airport radar systems, Man machine systems, Air traffic controllers, Pilots, Civil aviation (U)
IDENTIFIERS: *Area navigation, *Vertical area navigation, Dynamic simulation (U)

A dynamic simulation using the digital simulation facility at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey, was conducted to determine the effects of the air traffic control (ATC) system and the system users derivable from the use of area navigation (RNAV) and area navigation with vertical guidance (VNAV) in a high-density terminal area. The John F. Kennedy Airport airspace was configured with an RNAV/VNAV route system to provide the test bed for the study. The study analyzed selected controller workload and system performance measures for various mixtures of RNAV, VNAV, and radar-vectored operations. Results show that controllers can use RNAV/VNAV maneuvers in the control of traffic in lieu of radar vector techniques and that controller workload decreased as the level of RNAV/VNAV participation increased. Controller acceptance of RNAV/VNAV principles and techniques in the ATC terminal area increased as familiarity and experience with RNAV/VNAV were gained. Controllers favored the use of RNAV over a pure radar-vector environment, expressing the opinion that RNAV could provide benefits to both controller and system user. (U)

AD-A038 493 17/7 17/9 1/2
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

System Definition and Investigation of the On-Site Processing of Sensor Signals. Volume III. Appendices. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-Sep 76,
SEP 76 108P Wetzler,E. C. ;Zitman,L. H. ;
REPT. NO. APL/JHU-FP8-E-024-3
CONTRACT: DOT-FA75WA-3553
MONITOR: FAA-RD 77-12-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A038 491.
DESCRIPTORS: *Air traffic control radar beacon system, *Radar beacons, *Air traffic control systems, *Search radar, Inflight, Radar tracking, Air traffic, Data processing, Digitizers, Automation (U)

Specifications for Common Digitizer Data List and Analysis Program are presented. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 492 17/7 17/9 1/2
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

System Definition and Investigation of On-Site Processing of En Route Sensor Signals. Volume II. Beacon Processing Investigation. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-Sep 76, SEP 76 208P Thomas,J. W. ;
REPT. NO. APL/JHU-FP8-E-024-2
CONTRACT: DOT-FA75WA-3553
MONITOR: FAA-RD 77-12-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A038 493. Original contains color plates: All DDC reproductions will be in black and white.
DESCRIPTORS. *Air traffic control radar beacon system, *Radar beacons, *Air traffic control systems, *Search radar, Inflight, Radar tracking, Air traffic, Data processing, Digitizers, Automation (U)

This report discusses the analysis of the beacon performance of the Common Digitizer performed under Modification 1 to the contract. The objective listed in the Statement of Work of Modification 1 is 'to analyze the beacon performance of the Common Digitizer (CD) paying particular attention to the automation requirements of the en route portion of the National Airspace System (NAS)'. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 491 17/7 17/9 1/2
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LAB

System Definition and Investigation of the On-Site Processing of Sensor Signals. Volume I. Summary of Results, System Definition, Radar Processing. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-Sep 76, SEP 76 282P Thomas,J. W. ;Wetzlar,E. C. ;Zitzman,L. H. ;
REPT. NO. APL/JHU-FP8-E-024-1
CONTRACT: DOT-FA75WA-3553
MONITOR: FAA-RD 77-12-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A038 492.
DESCRIPTORS: *Air traffic control radar beacon system, *Radar beacons, *Air traffic control systems, *Search radar, Inflight, Radar tracking, Air traffic, Data processing, Digitizers, Automation (U)

The objective of this program was twofold: (1) to define requirements from the primary radar system and from the Air Traffic Control Radar Beacon System (ATCRBS) for the en route automation portion of the National Airspace System and (2) to unload the data line from the on-site surveillance system. The primary thrust of this investigation was directed towards the Common Digitizer (CD); the requirements placed on the CD by the Air Route Traffic Control Center's Central Computer Complex, the processing capabilities and limitations of the CD and the requirements the CD places on the surveillance sensors. This report documents the analytical and empirical investigations that were conducted in these areas in support of the stated objectives. Due to the magnitude of the results of this program, this report has been prepared in three volumes. This Volume 1 consists of (1) a summary of major results, conclusions, and recommendations for the entire program, (2) a description of the work accomplished and results obtained in the area of primary radar processing, (U)

AD-A038 297 6/16 6/19 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Sleep in Air Traffic Controllers, (U)

FEB 77 19P Saldivar,J. T. ;Hoffmann, S. M. ;Melton,C. E. ;
REPT. NO. FAA-AM-77-5

UNCLASSIFIED REPORT

DESCRIPTORS: *Sleep, *Air traffic controllers, Variations, Scheduling, Jobs, Biological rhythms, Adaptation(Physiology), Stress(Physiology), Attention, Performance(Human), Fatigue(Physiology), Rest, Quality, Statistical analysis, Aviation safety (U)
IDENTIFIERS: Job rotation, Work shifts (U)

Data obtained from sleep logs maintained for a period of 5 weeks by 185 air traffic controllers indicate that on a weekly basis there is no significant difference in the amount of sleep obtained by controllers working the 2-2-1 rotation pattern and that obtained by those on the 5-day rotation pattern. Controllers working the 2-2-1 rotation pattern slept significantly less prior to the midshift than they did before the evening and day shifts. On both the 2-2-1 and 5-day rotation patterns, the most sleep obtained was on the evening shift followed by the day shift and midshift respectively. Approximately half the controllers indicated satisfaction with their present shift rotations; however, preferences indicate that they would prefer to work a shift rotation that excluded the midshift. Age and experience do not appear to be related to pattern of sleep or amount of sleep obtained. 'Fatigue', 'weakness', and 'somnolence' were complaints most often expressed on the midshift on both rotation patterns. (U)

AD-A038 157 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Monopulse Summary. (U)

DESCRIPTIVE NOTE: Summary rept.,
FEB 77 96P Karp,D. ;Wood,M. L. ;
REPT. NO. ATC-72
CONTRACT: DOT-FA72-WAI-261
MONITOR: FAA-RD 76-219

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control radar beacon system, Radar beacons, Discrete address beacon systems, Boresighting, Multipath transmission, Antenna radiation pattern (U)

Improved azimuthal resolution of proximate aircraft necessary to support ATC automation can be achieved by beacon surveillance systems employing monopulse angle estimation techniques described in this report. Included in the report are the results of beacon surveillance monopulse system analyses relating to off-boresight angle estimation using short (1/2 microsec) pulses; the effects of specular and diffuse multipath signal return; the effects of overlapping ATCRBS fruit replies, and the problems of antenna pattern design. These topics have been studied in detail as part of the Lincoln Laboratory design of the Discrete Address Beacon System (DABS). This report summarizes significant analytical results obtained. In general, it has been concluded that the ATC environment does not pose a serious problem to the use of the monopulse concept for beacon system direction finding and that sufficient direction finding accuracy can be obtained using a small number of narrow pulses for each scan. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A038 133 17/7 5/9 17/2
MITRE CORP MCLEAN VA

Controller Productivity in the Upgraded Third Generation Air Traffic Control System. Part II: Automation in the Data Link Era. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 76 71P Keblawi,Feisal S. ;
REPT. NO. MTR-7319
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 76-3-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 1, AD-A034 527.
DESCRIPTORS: *Air traffic controllers, *Air traffic control systems, *Data links, Air traffic control terminal areas, Productivity, Savings, Automation, Discrete address beacon systems, Costs, Methodology, Personnel management, Towers (U)

This document is part two of two reports which were prepared to provide the latest estimates of the expected increase in productivity of enroute and terminal area air traffic controllers, due to the implementation of the Upgraded Third Generation control system. Part 2 addresses improvements in the data link era. The benefits due to the implementation of these automation programs are discussed in detail and transformed into dollar savings. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A037 931 17/9 17/7 1/5
AIR FORCE COMMUNICATIONS SERVICE RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Travis AFB, California. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 76 171P Pinney,Earl T. , Jr;
REPT. NO. 76/66R-78

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control systems, Radar landing control, Airport radar systems, Search radar, Air traffic control radar beacon system (U)
IDENTIFIERS: Precision approach radar, AN/FPN-55, AN/FPN-16, AN/TPX-42, Tracals project (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected from 6-22 Oct 76, to define the capabilities and limitations of the radar approach control (RAPCON) facility at Travis AFB, California. The RAPCON is comprised of the AN/FPN-55 airport surveillance radar (ASR), the AN/TPX-42(A)V Type III air traffic control radar beacon system (ATCRBS), the AN/FPN-16 precision approach radar (PAR), and the associated power systems. The report includes an explanation of the ASR angel and second-time-around clutter problems, descriptions of the useable radar coverage, descriptions of the effects of the special clutter reduction features on radar coverage, descriptions of the ATCRBS coverage and tracking capabilities, of the PAR coverage and tracking capabilities and the analysis of flight and equipment performance data. The capabilities and limitations presented are a guide for expected system performance until there is a modification to or relocation of the equipment or until a significant change occurs in the horizontal profile. (Author) (U)

AD-A037 801 17/7 14/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Policy Analysis of the Upgraded Third Generation Air Traffic Control System. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 155P Fromme,William R. ;Rodgers, John M. ;
REPT. NO. FAA-AVP-77-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Cost analysis, Airports, Congestion, Cost benefits, Aviation safety, Systems approach, Air traffic control terminal areas, User needs, Policies (U)
IDENTIFIERS: *Third generation air traffic control system (U)

This report provides a review of costs and benefits of the Upgraded Third Generator Air Traffic Control System (UG3RD) from a systems perspective and also reviews the feasibility and effectiveness of complementary policy strategies. The analysis values the costs and benefits of five alternative systems composed of potential combinations of UG3RD components. For each system, the added cost of airport and airway service was quantified for both the Federal Aviation Administration (FAA) and for airway users. Benefits consisted of increased airport capacity and reduced delay, savings from reduced FAA staff requirements, and improved airway system safety. In addition to estimating costs and benefits of various investments, the study investigates the impacts of airport quotas and peak pricing, increased use of satellite airports, and terminal control areas. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A037 790 17/7 17/9 14/1
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airport Surface Traffic Control Tags Planning Alternatives and Cost/Benefit Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Dec 75-Mar 76,
JAN 77 50P Rempfer,Paul S. ;
REPT. NO. TSC-FAA-76-23
MONITOR: FAA-RD 77-9

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Search radar, *Cost benefits, *Cost analysis, *Airport radar systems, Runways, Taxiways, Airports, Automatic, Display systems, Costs, Sensitivity (U)
IDENTIFIERS: TAGS(Tower Automated Ground Surveillance), Tower Automated Ground Surveillance (U)

The findings of a cost/benefit analysis of the deployment of a new airport ground surveillance system TAGS (Tower Automated Ground Surveillance) are presented. TAGS will provide a plan view display of aircraft on the airports taxiways and runways like ground surveillance radar (ASDE); but unlike ASDE, TAGS will perform in heavy precipitation and automatically acquire and display aircraft flight identity. The findings indicate that a TAGS deployment of between four and nine systems is cost/beneficial. The development plan, system costs, analysis appraoch and sensitivity analysis supporting the findings are provided. (Author) (U)

AD-A037 479 17/7 17/2 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report, Selfridge ANGB, Michigan, 9-18 November 1976. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 77 76P Buford,Jimmy D. ;
REPT. NO. 76/66C-83

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication equipment, Radar landing control, Aircraft landings, Very high frequency, Ultrahigh frequency, Propagation, Climate, Surface to air, Air to surface, Test and evaluation (U)
IDENTIFIERS: *Traffic control and landing systems, *Communications stations, TRACALS(Traffic Control and Landing Systems), RAPCON(Radar Approach Control), AN/FPN-16, AN/FPN-47, AN/UPX-6 (U)

Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Selfridge ANGB, Michigan (2031 Comm Sq) from 9 Nov through 18 Nov 1976. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications systems. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the RAPCON and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. The data and diagrams in this report can be used as guides for anticipated performance of the communications system at Selfridge ANGB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented are valid for other locations using the same communications equipment. (Author) (U)

AD-A037 225 17/7 1/2
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA SCIENCE AND TECHNOLOGY DIV

A Review and Analysis of the Mitre Beacon Collision Avoidance System. (U)

DESCRIPTIVE NOTE: Final rept. Sep 75-Sep 76,
OCT 76 211P Bagnall,James J. , Jr.;
Dausin,Lawrence R. ;Kay,Irvin W. ;Krinitz, Arthur ;
REPT. NO. S-481
CONTRACT: DOT-FA74WA-3498
MONITOR: FAA-RD 77-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Air traffic control radar beacon system, Radar interference, Aviation safety, Air traffic, Cost benefits, Active systems, Interrogation, False alarms (U)

This report presents the results of IDA's study and analysis of the beacon collision avoidance system (BCAS) design proposed by The MITRE Corporation. This system, referred to herein as MCAS, is an active collision avoidance system which makes use of air traffic control radar beacon system (ATCRBS) transponders already possessed by a large fraction of the flying aircraft population. It is also compatible with the discrete address beacon system (DABS) in anticipation of that system's eventual adoption in place of ATCRBS. MCAS derives the same economic benefits accruing to any BCAS by virtue of relying on the use of ATCRBS transponders already installed in many aircraft. However, because the system is active, its design must assume, in principle, that airborne MCAS interrogator equipment will be limited to about ten percent of the flying population in order to avoid excessive garble for its own purposes and interference with regular ATCRBS ground stations. MCAS uses essentially the same threat logic for encounters between MCAS-equipped aircraft which was recommended by ANTC-117 and its performance will therefore suffer the same deficiencies resulting from the use of that logic as predicted in previous IDA studies. These deficiencies are a high natural alarm rate due to a lack of certain parameter data, (U)

AD-A037 160 17/7
PRICE WILLIAMS AND ASSOCIATES INC SILVER SPRING MD

ARTS-II Enhancements Costs and Benefits, (U)

SEP 76 69P Willis,K. ;
CONTRACT: DOT-FA76WAI-600
MONITOR: FAA-AVP 76-16

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control radar beacon system, Air traffic control terminal areas, Altitude controllers, Radar tracking, Automation, Cost benefits, Radar beacons, Radar trainers (U)
IDENTIFIERS: ARTS 2 system, ARTS(Automated Radar Terminal Systems), Automated radar terminal systems (U)

This document presents an analysis of benefits and costs expected to accrue from potential enhancement features to the basic ARTS-II terminal automation system. It defines the sources of benefits both quantifiable and nonquantifiable. The study provides information in present value dollars for the equipment life cycle. Further it includes a sensitivity analysis of key assumptions and a deferral analysis. An examination is first conducted of typical terminal automation enhancement features for their applicability to the ARTS-II system and its environment. Those major features which outwardly appear most desirable are analyzed to determine their quantifiable and nonquantifiable benefits. The major source of benefits in an ARTS-II Enhancement program was found to be improved safety brought about by the Minimum Safe Altitude Warning and the Conflict Alert features. There is also some productivity gain attributable to a radar training simulator capability. Program costs are estimated and converted to present value costs. A comparison of present value benefits to present value cost is made to determine the benefit/cost ratio. (Author) (U)

AD-A037 080 5/3 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Airport Quotas and Peak Hour Pricing: Analysis of Airport Network Impacts. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 76 171P Fromme,William R. ;Swan, William M. ;
REPT. NO. FAA-AVP-77-12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. FAA-AVP-77-5, AD-A036 773.
DESCRIPTORS: *Airports, *Air traffic control systems, *Economic analysis, Congestion, Commercial aviation, Cost analysis, Economic models, Marketing, Air traffic, Networks (U)
IDENTIFIERS: Prices, Quotas (U)

This report provides an evaluation of the impacts of airport quotas and peak-hour pricing on air traffic congestion and airport system delay. This analysis addresses two issues. First, would a schedule of peak-load pricing and quotas reduce airport system delays. Second, would a schedule of peak-pricing and quotas complement the system improvements provided by the technological features of the UG3RD. It is concluded, as a result of this analysis, that, in theory, peak-hour pricing and quota alternatives would effectively complement the technological features of the UG3RD by relieving aircraft congestion and delay and improving the flow of air traffic between the 25 largest air carrier airports. While there are theoretical advantages to pricing and quota alternatives, there are economic and institutional constraints limiting their implementation on a widespread scale. Included among these constraints are the unresolved issues which might confront the FAA, airport sponsors, and the airlines. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A037 064 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Analysis of the Impact of Terminal Control Area (TCA) Implementation on General Aviation Activity. (U)

DESCRIPTIVE NOTE: Final rept. Aug-Nov 75, MAY 76 82P Daniels,James M. ;
REPT. NO. FAA-AVP-77-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Civil aviation, Airports, Congestion, User needs, Air traffic, Surveys, Time series analysis, Regression analysis, Overflight, Impact (U)

This report describes an investigation of the probable effect of selected TCA implementation upon general aviation operations. The results are obtained from an analysis of historical time series data as well as current traffic survey data. The specific findings were: the establishment of a TCA (either Group I or Group II) does not appear to dramatically affect the total number of airport operations attributable to general aviation aircraft; the presence of a TCA at a large hub airport is accompanied by a marked shift towards the more sophisticated, more expensive, primarily business oriented aircraft; overflight and secondary operations are not obviously affected by the presence or absence of a TCA; and the profile of general aviation overflight and secondary operations shows no correlation with the presence o type of TCA. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A037 022 17/7 1/5
CHAMPLAIN TECHNOLOGY INDUSTRIES PALO ALTO CALIF

Terminal Area Design - Analysis and validation of RNAV Task Force Concepts. (U)

DESCRIPTIVE NOTE: Final rept., OCT 75 443P McConkey ,Edwin D. ;Clark, William H. ;
CONTRACT: DOT-FA72WA-3098
MONITOR: FAA-RD 76-194

UNCLASSIFIED REPORT

DESCRIPTORS: *Navigation, *Air traffic control terminal areas, *Airports, Air traffic controllers, Runways, Routing, Validation, Real time, Flight paths, New York City(New York), San Francisco(California), High density, High altitude, Low altitude (U)
IDENTIFIERS: Design, New Orleans(Louisiana), Miami(Florida), Philadephia(Pennsylvania), Denver(Colorado), Chicago(Illinois) (U)

This document describes the development of Area Naviagtion (RNAV) terminal area design guidelines for application to medium and high density terminal areas. The design concepts proposed by the FAA/ Industry RNAV Task Force were utilized in the development of initial time-phased 2D terminal area designs for Chicago, Denver, Miami, New Orleans, New York, Philadelphia and San Francisco. The time phases correspond to the three time periods postulated by the Task Force: 1972-1977, 1977-1982, and post-1982. The 1972-77 and 1977-82 transition period designs were analyzed in conjunction with a real time simulation to confirm the pilots' and controllers' capability to operate efficiently in a mixed VOR/ RNAV environment. The post-1982 designs were subjected to a user economic impact analysis to determine the effects of route length and altitude restrictions on fuel and time. Two 100% fixed gradient VNAV designs were developed for New York and New Orleans using Task Force concepts and were analyzed for their impact on the user and the system.

(U)

AD-A036 895 1/2 17/7
MITRE CORP MCLEAN VA

Estimation of UG3RD Safety Benefits. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 79P Simpson,T. R. ;Smith,A. P. ;Matney,J. S. ;
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-AVP 77-8

UNCLASSIFIED REPORT

DESCRIPTORS: *Aviation safety, *Air traffic control systems, Collisions, Civil aviation, Aviation accidents, Prevention, Cost benefits, Cost analysis (U)
IDENTIFIERS: Third generation (U)

This study estimates the value of aviation safety improvements that could be obtained by implementing various alternative configurations of the Upgraded Third Generation ATC System. Estimates are based on the central assumption that the frequency of aviation accidents per operation observed in the past will be repeated unless identifiable steps are undertaken to eliminate specific classes of accidents. Recent accident data on midair collisions and controlled collisions with the terrain were examined to identify types of accidents that could be prevented by the UG3RD. Preventable accident rates were calculated and used to forecast future accidents under an extension of today's system and accidents that could be prevented by the UG3RD. (Author) (U)

AD-A036 894 1/5 5/1
BATTELLE COLUMBUS LABS OHIO

Estimation of UG3RD Delay Reduction. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 69P Rogers,Robert A. ;Drago, Vincent J. ;Cheaney,Edward S. ;
MONITOR: FAA-AVP 77-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Airports, *Air traffic, Congestion, Air traffic control systems, Runways, Capacity(Quantity), Queueing theory, Planning (U)

The study estimates aircraft and passenger delays that will be encountered at 30 large terminals during the period 1976 through 2000. Delay estimates are prepared for two scenarios--(1) no change in existing runway capacity and (2) changes in future runway capacity resulting from the introduction of the Upgrated Third Generation Air Traffic Control System (UG3RD). Delay estimates were obtained from application of a deterministic, steady state runway queuing model. Results of this research were incorporated in a cost-benefit analysis of the UG3RD ATC system. (Author) (U)

AD-A036 892 17/7 1/5
NOAH (J WATSON) ASSOCIATES INC ALEXANDRIA VA

An Econometric Analysis of Enroute and Terminal Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. 31 Dec 75-30 Jun 76,
JUN 76 79P Eskew,Henry L. ;Frazier, Thomas P. ;Smith,Beatrice M. ;
CONTRACT: DOT-FA76WA-3769
MONITOR: FAA-AVP 77-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Perpared in cooperation with Administrative Sciences Corp., Alexandria, Va., Rept. no. ASC-R-110.
DESCRIPTORS: *Air traffic control system analysis, *Econometrics, Air traffic control terminal areas, Investment expenditures, Labor, Production models, Optimization, Mathematical models, Airport control towers, Air control centers (U)

This study was undertaken in connection with a comprehensive evaluation of proposed new investments in the upgraded Third Generation Air Traffic Control System. It involved a quantitative analysis of the relationship between ATC system outputs and inputs. Outputs are defined in terms of operations handled while inputs consist of labor and capital. Separate production functions were estimated for enroute (ARTCC) and terminal (tower) control operations. In each case, two different sets of data were used. One consisted of a cross-section of observations on individual facilities in a single year. The other was a time series of annual observations on that portion of the system taken as a whole. Following development of the production functions, an optimality analysis was conducted. Estimates of the unit cost of labor and capital were developed. These were combined, via a mathematical optimization procedure, with the preferred production functions to compute least-cost combinations of labor and capital for various levels of ATC service demand. The results indicate that, for both centers and towers, substantial additions to the net capital stock will be required over the years to come if expansion of the system (to meet growing service demand) is to be economically efficient. (U)

AD-A036 772 17/7 5/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Estimation of UG3RD Productivity Impacts. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 77 58P Rodgers,John M. ;
REPT. NO. FAA-AVP-77-4

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Productivity, Automation, Personnel management, Cost effectiveness, Manpower, Costs, Air traffic controllers (U)

This study estimates the value of savings attainable from reduced Air Traffic Service staff requirements associated with implementation of the Upgraded Third Generation Air Traffic Control System (UG3RD). Estimates of staff requirements, assuming either a continuation of the present air traffic control system or alternatively, various UG3RD improvements, were prepared from an analysis of specific job functions at sample facilities. Sample estimates were expanded to provide estimates of required staff at all centers and 30 selected TRACONS and/or terminals for the period 1976 and 2000. Manpower differentials were calculated and valued at an average 1975 wage plus benefit cost. (Author) (U)

AD-A036 439 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report, Holloman AFB, New Mexico, 8-27 September/7-15 October 76. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 77 120P Chaumont,Roderick C. ;
REPT. NO. 76/66R-79

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control systems, Search radar, Airport radar systems, Air traffic control radar beacon system, New Mexico (U)
IDENTIFIERS: Precision approach radar, AN/FPN-47, AN/TPX-42(A)v, AN/FPN-16, TRACALS(Traffic control and landing systems) (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the radar approach control (RAPCON) facility at Holloman AFB, New Mexico. The data presented in this report were collected during two evaluation periods; 8 through 27 September 1976, and 7 through 15 October 1976. The RAPCON facility is comprised of AN/FPN-47 airport surveillance radar (ASR), AN/TPX-42 (A)V Type III air traffic control radar beacon system (ATCRBS), AN/FPN-16 precision approach radar (PAR), and associated power and communications systems. This report includes descriptions of the useable radar coverage, the radar coverage diagrams, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the ASR, ATCRBS, and PAR systems. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

AD-A035 204 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

IFR Aircraft Handled Forecast by Air Route Traffic Control Center, Fiscal Years 1977-1988. (U)

NOV 76 54P
REPT. NO. FAA-AVP-76-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic, *Instrument flight, Statistical data, Air traffic controllers, Air control centers, Air traffic control systems, Data bases, Geographical distribution, Planning, Budgets, Civil aviation, Military aircraft (U)
IDENTIFIERS: Federal Aviation Agency (U)

The report presents the forecasts of Instrument Flight Rule (IFR) aircraft handled by FAA air route traffic control centers (ARTCC). It serves as a base for the FAA planning and budget process in determing future requirements for facilities, equipment and manpower. The forecasts show that total aircraft handled will increase from 23.9 million in FY 1976 to 39.2 million in FY 1988. These national total numbers along with those for the intervening years are broken down by FAA region and by each air route traffic control center in this report. (U)

AD-A035 095 17/7 5/9 5/5
STANFORD RESEARCH INST MENLO PARK CALIF

Advanced Productivity Analysis Methods for Air Traffic Control Operations. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Dec 76,
DEC 76 197P Tuan,P. L. ;Procter,H. S. ;Couluris,G. J. ;
CONTRACT: DOT-TSC-1128
MONITOR: FAA/RD,TSC 76/164,FAA-76-27

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic controllers, *Work measurement, Performance(Human), Productivity, Traffic, Economic models, Network analysis(Management), Computerized simulation, Air transportation (U)
IDENTIFIERS: RECEP(Relative Capacity Estimating Process), *Workloads, *Relative capacity estimating process, Air traffic flow (U)

This report gives a description of the Air Traffic Control (ATC) productivity analysis methods developed, implemented, and refined by the Stanford Research Institute (SRI) under the sponsorship of FAA and TSC. Two models are included in the productivity analysis methodology. The first is the Relative Capacity Estimating Process (RECEP) that models the traffic handling capabilities of individual ATC sectors in terms of routine, surveillance, and conflict-processing workloads. The second model is the Air Traffic Flow (ATF) model that simulates a multisector ATC network by tracing aircraft flows from sector to sector; and measuring traffic loadings, workload requirements, and delays under given sets of traffic input parameters and congestion-relief strategy. The report covers the background and application experiences of the two models as well as technical descriptions of their input/output specifications, model structures, field data collection and reduction techniques, and potential model applications. Finally, a hypothetical example illustrating a typical RECEP/ATF application, together with post-simulation output analyses, are given. (U)

AD-A034 902 17/7 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Simulation Study of Intermittent Positive Control in a Terminal Area Air Traffic Control Environment. (U)

DESCRIPTIVE NOTE: Final rept. May-Sep 75,
JAN 77 90P Rossiter,S. ;Windle,J. ;
Strack,R. ;Mullen,W. ;
REPT. NO. FAA-NA-76-32
MONITOR: FAA-RD 76-193

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, Simulation, Computerized simulation, Algorithms, False alarms, Collision avoidance, High density (U)
IDENTIFIERS: Intermittent positive control (U)

A dynamic simulation was conducted to provide an initial and limited investigation into the operational and procedural problems that may exist when intermittent positive control (IPC) is present within a terminal area air traffic control (ATC) system. The simulation was performed at the National Aviation Facilities Experimental Center (NAFEC) and utilized the digital simulation facility (DSF). The test environment simulated a single Discrete Address Beacon System (DABS) sensor site and used the IPC algorithm provided by the MITRE Corporation. The results indicated that the algorithm tested at NAFEC adversely interacted with the present ATC system in a number of operational areas. Rather than remaining passive until required, IPC generated controller alerts and, at times, commands when controllers were following normal procedures and aircraft pairs were well outside ATC separation standards. These unnecessary alerts occurred most frequently between arrivals in the final approach area and between arrivals and departures in those areas where routes crossed. The arrival encounters usually involved high closure rates, and, in general, all encounters demonstrated that a lack of knowledge of ATC intent and a sensitivity to controller technique precipitated the premature IPC activity. Data indicated that significant reductions in the (U)

AD-A034 752 1/2 6/19
FEDERAL AVIATION ADMINISTRATION OKLAHOMA CITY OKLA CIVIL AEROMEDICAL INST

Stress in Air Traffic Controllers: Effects of ARTS-III, (U)

NOV 76 16P Melton,C. E. ;Smith,R. C. ;McKenzie,J. M. ;Hoffman,S. M. ; Saldivar,J. T. ;
MONITOR: FAA-AM 76-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Automation, *Stress(Physiology), Heart rate, Anxiety, Catecholamines, Urine, Stress(Psychology) (U)
IDENTIFIERS: Automated radar terminal systems (U)

Physiological, biochemical, and psychological assessments of stress in air traffic controllers were made at Los Angeles (LAX) and Oakland (OAK) Terminal Radar Approach Control (TRACON) facilities before and after installation of Automated Radar Terminal Systems-III (ARTS-III). Heart rates of controllers on duty or at rest scarcely changed from before to after ARTS-III installation. Total stress increased at both TRACONs, and the increase was entirely due to elevated catecholamine excretion. Steroid excretion was significantly reduced at both facilities after ARTS-III installation. Scores on the A-State scale of the State-Trait Anxiety Inventory indicated that introduction of ARTS-III had no appreciable effect on work-related anxiety levels of controllers. The post-ARTS-III A-State means for both facilities were not significantly elevated. A-Trait was unchanged at LAX but decreased significantly at OAK. Assessments of A-State showed significant work-related increments but tended to be low. (U)

AD-A034 527 1/2 5/9
MITRE CORP MCLEAN VA

Controller Productivity in the Upgraded Third Generation Air Traffic Control System. Part I. Automation in the Pre-Data Link Era. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 76 107P Keblawi,Feisal S. ;
REPT. NO. MTR-7212
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 76-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Productivity, Control systems, Automation, Methodology, Personnel management, Costs (U)

This document is one of two reports which were prepared to provide the latest estimates of the expected increase in productivity of enroute and terminal area air traffic controllers, due to the implementation of the Upgraded Third Generation Control system. Part I addresses the automation improvements in the pre-data link era. A new methodology for projecting staffing requirements is provided which makes it possible ot assess the impact of varying degrees of improvements in different types of facilities. The benefits due to the implementation of these automation programs are discussed in detail and transformed into dollar savings. (Author) (U)

AD-A034 494 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Airspace Configuration and Separation Evaluation--Configuration and Procedures--Terminal ATC Digital Display System Errors, ARTS III. (U)

DESCRIPTIVE NOTE: Final rept. Dec 73-Jan 76, NOV 76 167P Morgan,Harry T. , Jr.; Moss,Arthur R. ;
REPT. NO. FAA-NA-76-6
MONITOR: FAA RD-76-178

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control radar beacon systems, *Air traffic control terminal areas, *Display systems, Radar beacons, Radar tracking, Position finding, Digital systems, Automation (U)

The major position and separation errors associated with the digital data provided to the radar controller by the Automated Radar Terminal System (ARTS III) are quantitatively assessed to provide the basis for specifying the air traffic control separation minima in ARTS-controlled airspace. The National Aviation Facilities Experimental Center provides a Terminal Automation Test Facility at the Atlantic City Airport with a full complement of technical support facilities and engineering staff; here, an extensive series of live and simulated flight tests were conducted. The methodology, results, and conclusions of this effort are discussed. The results indicate that 99.9 percent of the overall range and azimuth errors can be expected to fall within + or - 0.16 nmi and + or - 1.43 deg, respectively, about their mean errors with a confidence of 90 percent. These errors are less than those generated in trying to read position from the radar displays. The ARTS III Radar Beacon Tracking Level system reported on herein utilized existing prototype hardware and software as available in early 1974. Many of the capabilities described in this report have since been enhanced by a continuing development program. (U)

AD-A034 314 1/5 4/2
AIR FORCE GEOPHYSICS LAB HANSCOM AFB MASS

Airfield Weather Observing Systems, (U)

DEC 76 7P Hering,Wayne S. ;Moroz, Eugene Y. ;Tahnk,William R. ;
REPT. NO. AFGL-TR-76-0289
PROJ: 667C
TASK: 05

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Conference on Aerospace and Aeronautical Meteorology and Symposium on Remote Sensing from Satellites (7th) 16-19 Nov 76, Melbourne, Fla.
DESCRIPTORS: *Weather stations, *Air traffic control systems, Observation, Measuring instruments, Automation, Visibility, Transmissometers, Cloud height indicators, Optical radar, Wind direction indicators, Profiles, Vertical orientation, Temperature, Microprocessors, Commercial equipment, Prototypes, Altimeters (U)
IDENTIFIERS: MAWS(Modified Automated Weather System), Modified Automated Weather System, WUAFGL66700502, PE62101F (U)

A prototype model of a new Modular Automated Weather System (MAWS) will be installed at Scott AFB IL for direct demonstration of its utility in support of fixed base military airfield operations. Remote microprocessor data units provide the flexibility to substitute or add sensor, processing and display components as needed to satisfy local base requirements. The demonstration model emplys off-the-shelf commercial sensors and standard equipment inventory including automated versions of the conventional transmissometer and rotating beam ceilometer instruments. The system has an instrumented tower which provides vertical profiles of visibility, wind and temperature near the approach zone. (U)

AD-A034 222 17/7 17/2
MITRE CORP MCLEAN VA METREK DIV

A Description of the Phase I Automated Terminal Services Concept. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 76 120P Morgenstern,B. ;Telsch,R. ;
REPT. NO. MTR-7376
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 76-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Airport control towers, *Discrete Address Beacon Systems, Voice communications, Data links, Minicomputers, Air Traffic Control Systems, Pilots, Man machine systems, Instrument flight, Patterns, Automatic, Avionics (U)

Research has been initiated to study the concept of Automated Terminal Services (ATS). Work is being done to: 1) define a Phase I baseline system for airports with operations rates near the threshold of eligibility for a manned control tower and 2) in Phase 2, to explore advanced hardware and control concepts (such as Discrete Address Beacon System data link). Potential roles for the Phase I system are: 1. Substitute for new control towers, 2. Additional safety at presently uncontrolled airports, 3. Shift reliever at manned control towers. This document describes the Phase 1 Automated Terminal Services concept in sufficient detail to let analysis, simulation, and flight test efforts proceed. The hardware and software configuration of the system is described along with specific services which generate automatic voice messages to the aircraft operating at an ATS airport. Examples of pilot interaction with the system are presented. (Author) (U)

AD-A034 195 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

SRDS Technical Program Document, Fiscal Year 1977 Engineering and Development Approved Programs. (U)

OCT 76 149P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 75, AD-A011 088.
DESCRIPTORS: *Air traffic control systems, *Air transportation, *Civil aviation, Systems engineering, Radar, Radar beacons, Navigation, Communication and radio systems, Landing aids, Aviation safety, Weather, Airports, Planning (U)

The report contains Research and Technology Resumes which reflect Systems Research and Development Service, Federal Aviation Administration, approved subprograms. These resumes identify the technical objective, approach, milestones scheduled for accomplishment, end-item products, and FY-76 accomplishments, and source of requirements. (U)

AD-A033 820 17/7 17/2.1
MITRE CORP MCLEAN VA

A Possible Impact of the Joint Tactical Information Distribution System (JTIDS) on ASTRO-DABS. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 76 42P Weinberg,A. ;
REPT. NO. MTR-7301
CONTRACT: DOT-FA70WA-2449
MONITOR: FAA-EM 76-9

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Tactical communications, *Electromagnetic compatibility, L band, Beacons, Radio links, Tactical data systems, Data links, Errors, Interference, Frequency allocation (U)
IDENTIFIERS: ASTRO-DABS Air traffic control system, Joint tactical information distribution system, JTIDS(Joint Tactical Information Distribution System) (U)

The development of the ASTRO-DABS concept to date has assumed availability of the Aeronautical L-band. Due to its increased usage, however, consideration is being given to operating ASTRO-DABS in the TACAN band, a portion of the frequency spectrum which is also being considered for use by the military program JTIDS (Joint Tactical Information Distribution System). Because of JTIDS operating characteristics, there is concern that ASTRO-DABS performance may be impaired. The present report presents a preliminary analysis, and corresponding numerical results, as to the impact of JTIDS on ASTRO-DABS. Areas for possible future investigation, and means for more detailed analyses, are also included. The preliminary indications, however, are that coexistence of ASTRO-DABS and JTIDS in the same frequency band would severely degrade the downlink (satellite-to-aircraft) performance of ASTRO-DABS. (U)

AD-A033 703 5/9 17/7
AIR FORCE OCCUPATIONAL MEASUREMENT CENTER LACKLAND AFB TEX

Air Traffic Control Operator/Technician Career Ladder, AFSCs 272X0/A/B/C/D and 27290. (U)

DESCRIPTIVE NOTE: Occupational survey rept.
OCT 76 97P
REPT. NO. AFPT-90-272-197

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Career ladders, *Job analysis, Operators(Personnel), Technicians, Radar operators, Skills, Supervisors, Specialists, Air Force training, Curriculum, Functional analysis, Military requirements, Allocations, Job satisfaction, Reenlistment (U)
IDENTIFIERS: Military occupational specialties, Occupational surveys (U)

This report concludes that: (1) Because of the wide variation in percent members from each AFSC and shredout group performing tasks related to the various STS paragraphs, consideration should be given to separating the 272X0 STS (covering AFSCs 272X0, 272X0A, 272X0B, and 272X0C) into separate STSs or subdividing the current STS into shredout sections; and (2) Consideration shoud also be given to changing basic course 3ABR27230. Currently, all personnel are trained on tower, radar, and other functions, regardless or first assignment. However, task performance data indicated that personnel are assigned initially to only one of these functions. (U)

AD-A033 068 17/7 1/5 1/4
AIR FORCE COMMUNICATIONS SERVICE RICHARDS-GEBAUR AFB MO

Air Traffic Control Radar Beacon System. Special Evaluation Report. Pease AFB, New Hampshire. (U)

DESCRIPTIVE NOTE: Final rept., NOV 76 57P Smith,David E. ;
REPT. NO. 76/66S-75

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control radar beacon system, *Landing aids, False targets, Logistics support, Radar transmitters (U)
IDENTIFIERS: Tracals (U)

This traffic control and landing systems (TRACALS) radar special evaluation report presents data collected to document the air traffic control radar beacon system (ATCRBS) reflection situation at Pease AFB, New Hampshire. The data presented in this report was collected during the evaluation period 14 to 20 July 1976. This report identifies the sources of reflection and the expected areas of false target display. The information in this report should be used as a source document for a future corrective action to eliminate false targets at Pease AFB as well as other Air Force bases. (Author) (U)

AD-A033 055 17/9 9/5 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

An Investigation into the Capability of Monitoring a Phased Open-Array Antenna. (U)

DESCRIPTIVE NOTE: Final rept. Sep-Oct 75, OCT 75 57P Talotta,Nicholas J. ;
REPT. NO. FAA-NA-76-25
MONITOR: FAA-RD 76-150

UNCLASSIFIED REPORT

DESCRIPTORS: *Phased arrays, *Radar antennas, *Radar beacons, *Air traffic control radar beacon system, Ground stations, Monitoring, Near field (U)

A requirement exists to develop a monitoring capability for air traffic control radar beacon system ground station equipments. The National Aviation Facilities Experimental Center has conducted tests of the Hazeltine open-array antenna to determine if it can be monitored in the electrical near-field of the antenna. Comparison-type data were obtained in the electrical near- and far-field of the antenna. The data indicate that the antenna can be monitored in the near-field. (Author) (U)

AD-A033 052 17/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Operational and Technical Analysis GTE/ WESCOM KEY/Automatic Call Distributor Communication System, Portland, Oregon, Flight Service Station. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 76 121P Ohman,Richard K. ;Sawtelle, Edward M. ;
REPT. NO. FAA-NA-76-11
MONITOR: FAA-Ru 76-148

UNCLASSIFIED REPORT

DESCRIPTORS: *Telephone systems, *Air traffic control systems, *Intercommunication systems, Distribution, Logic, Errors, Questionnaires, Monitors, Radio equipment, Power supplies, Recording systems, Failure, Maintainability, Test and evaluation (U)
IDENTIFIERS: Automatic call distributors (U)

Field test and evaluation of the Portland, Oregon, Flight Service Station (FSS) GTE/ WESCOM Key/Automatic Call Distributor Communication System (ACD) were accomplished to determine the applicability of the equipment as a system to be specified for high-activity FSS's. The system test and evaluation were accomplished by (1) evaluation of normal facility operation, (2) conduct of scripted tests, (3) analysis of FSS specialist's responses to questionnaires, and (4) analysis of operational failure logs and equipment design. Performance of the Common Control Subsystem, as limited to the Portland FSS, generally evidenced the requisite degree of utility and service efficiency. The ACD function, on occasion, did evidence equal distribution of inbound calls to the in-service Preflight positions. (U)

AD-A033 050 17/2.1 9/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Data Link Subsystem Laboratory Tests. (U)

DESCRIPTIVE NOTE: Final rept. Oct-Nov 74,
NOV 76 23P Swezeny,Anthony J. ;
REPT. NO. FAA-NA-75-29

UNCLASSIFIED REPORT

DESCRIPTORS: *Data links, *Transmitter receivers, *Modems, *Air traffic control systems, Surface to air, Very high frequency, Noise(Radio), Digital systems, Errors, Airborne, Simulation, Density, Data rate (U)

Various very high frequency (VHF) transmitter-receiver combinations were used with minimum shift key (MSK) modems for bit error rate tests at 2400 and 4800 bit/second (b/s) rates and at various radiofrequency (RF) noise density levels over a simulated RF digital data link. Results indicated that to obtain the same bit error rate performance, the energy to noise (E/No) requirements differed up to 3.5 dB at 2400 b/s and up to 6 dB at 4800 b/s for the various transmitter-receiver combinations in the ground/air channel. (Author) (U)

AD-A032 742 17/7 1/5 9/3
MCDONNELL DOUGLAS ELECTRONICS CO ST CHARLES MO

Synchronization Station Location Study. Summary. (U)

DESCRIPTIVE NOTE: Final rept. Oct 72-May 74, JUL 74 108P Holt,J. M. ;Watson,F. D. ;
CONTRACT: DOT-FA73WA-3172
MONITOR: FAA-RD 74-120

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. FAA-RD-73-102 dated Jul 73, AD-768 677, Rept. no. FAA-RD-73-173 dated Oct 73, AD-779 538 and Rept. no. FAA-RD-74-117 dated May 74, AD-785 335.
DESCRIPTORS: *Air traffic control systems, *Time signals, *Ground stations, *Site selection, *Synchronization(Electronics), Tacan, Computerized simulation, Air space, Models, Locators, Algorithms, Mathematical analysis, Clouds, Commercial aviation, Radio links, Collision avoidance (U)
IDENTIFIERS: VOR (U)

A technology for evaluating ground station sites on the basis of their effectiveness in disseminating time synchronization has been produced. Analytical studies have complemented the concept of computer modeling of the airspace population, then quantitatively assessing the effectiveness of various configurations and deployment of time disseminating equipments. A unique feature is the ability to evaluate the effectiveness of ground based master stations with and without aircraft hierarchal time synchronization relay. These techniques were applied in making trade-off evaluations of the overall synchronization effectiveness of various levels of airborne vs. ground-based hierarchal time relaying equipage. It is shown that the number of ground-based master stations required to supply a desired level of synchronization coverage to all aircraft (hierarchal and nonhierarchal), increases rapidly as the number of hierarchal aircraft is diminished.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A032 736 17/9 1/5 17/7 4/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Radar Detection of Thunderstorm Hazards for Air Traffic Control. Volume II. Radar Systems. (U)

DESCRIPTIVE NOTE: Project rept., OCT 76 73P Sussman,S. M. ;
REPT. NO. ATC-67-Vol-2
CONTRACT: F19628-76-C-0002, DOT-FA74WAI-485
MONITOR: FAA/RD 76/52-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A032 732.
DESCRIPTORS: *Meteorological radar, *Thunderstorms, *Air traffic control systems, *Ground clutter, *Doppler radar, *Signal processing, *Airport radar systems, Dynamic range, Hazards, Turbulence, Surveillance, Radar antennas, Polarization, Dual channel, Orthogonality, Moving target indicators (U)
IDENTIFIERS: *Precipitative reflectivity, Sensitivity time control (U)

Radar systems are investigated for the acquisition of weather data to support detection and forecasting of hazardous turbulence assoicated with individual storm cells. Utilization of the FAA Airport Surveillance Radar (ASR) is explored. The issues of antenna polarization and Sensitivity Time Control (STC) that impact on shared operation for aircraft and weather detection are addressed. Candidate system configurations employing a common RF channel and dual orthogonal polarization channels are discussed. Ground clutter discrimination by coherent Doppler and noncoherent (Doppler spread) processing methods is described. An interim procedure is suggested for obtaining fixed reflectivity contour data from a Moving Target Detector for use in the all-digital ARTS. A preliminary design is presented for a new joint-use, long-range weather radar to support enroute air traffic controllers and to meet the data requirements of the National Weather Service and the Air Weather Service. (Author) (U)

AD-A032 732 17/9 1/5 17/7 4/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Radar Detection of Thunderstorm Hazards for Air Traffic Control. Volume I. Storm Cell Detection. (U)

DESCRIPTIVE NOTE: Project Rept., OCT 76 60P Crane,Robert K. ;
REPT. NO. ATC-67-Vol-1
CONTRACT: F19628-76-C-0002, DOT-FA74WAI-485
MONITOR: FAA-RD 76-52-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A032 736.
DESCRIPTORS: *Meteorological radar, *Thunderstorms, *Air traffic control systems, *Airport radar systems, Weather forecasting, Algorithms, Aviation safety, Hazards, Convection(Atmospheric), Turbulence, Warning systems, Doppler effect, Spectra, Radar beams (U)
IDENTIFIERS: *Storm detection, Beamwidth (U)

A procedure was developed to detect hazardous regions within thunderstorms using weather radar data. The procedure is based upon the hypothesis that convective turbulence occurs within 2-3 km of relative radar reflectivity maxima (cells). The hypothesis was tested using a limited set of simultaneous aircraft radar data. Good agreement was found between the observed regions of convective turbulence and the cell locations determined by radar. The viability of the hazard detection hypothesis as a basis for automatic warning and forecast depends upon the reliability of the cell detection and tracking algorithms. Analysis of precision radar data revealed that the cells are small in area extent, have a detection probability in excess of 0.9 using multiple radar scans, and are readily tracked for periods between 10 and 20 minutes. The characteristics of radar systems for acquiring data to support cell detection, are discussed. The role of Doppler spectral data is explored, and it is found that practical limitations on radar beamwidth hamper direct observation of turbulence on the scale size hazardous to aircraft. (Author) (U)

AD-A032 728 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Aviation Forecasts - Fiscal Years 1977 - 1988. (U)

SEP 76 108P
REPT. NO. FAA-AVP-76-17

UNCLASSIFIED REPORT

DESCRIPTORS: *Commercial aviation, *Air transportation, *Air traffic, Air traffic control terminal areas, Airport control towers, Federal budgets, Routing, Scheduling, Forecasting, Cargo aircraft (U)
IDENTIFIERS: Federal Aviation Administration, Air carriers (U)

This report contains the latest Federal Aviation Administration forecast of measures of workload and activity at towered airports, air route traffic control centers, and flight service stations for Fiscal Years 1977 to 1988. The forecasts were made for the four major users of the system; air carriers, air taxi, general aviation and the military. The report has been prepared to meet the budget and planning needs of the various offices and services of FAA for data concerning future trends in aviation activity. (U)

AD-A032 605 1/2 1/5 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C INFORMATION AND STATISTICS DIV

Current Aviation Statistics. Air Traffic Activity, Fiscal Year 1976. (U)

NOV 76 21P

UNCLASSIFIED REPORT

DESCRIPTORS: *Commercial aviation, *Air traffic, *Air traffic control terminal areas, *Airport control towers, Airports, Statistics (U)
IDENTIFIERS: Transatlantic flights, Domestic (U)

'Current Aviation Statistics' is prepared periodically to provide a summary of current aviation statistical information. This report is prepared in the Office of Management Systems, Information and Statistics Division, Information Operations Branch. (Author) (U)

AD-A032 559 1/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airline Delay Trends, 1973-1974. A Study of Block Time Delays, Ground and Airborne, for Scheduled Air Carriers. (U)

DESCRIPTIVE NOTE: Annual rept. 1973-1974,
JUL 76 462P Condell,Helen M. ;Horowitz, Seymour M. ;Kaprelian,Alan S. ;
REPT. NO. TSC-FAA-76-24
MONITOR: FAA-EM 76-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. FAA-EM-74-11-Vol-1, AD-A015 870 and Rept. no. FAA-EM-74-11-Vol-2, AD-A019 221.
DESCRIPTORS: *Commercial aviation, *Delay, *Air traffic control systems, *Scheduling, Civil aviation, Time intervals, Arrival, Flight paths, Airports, Routing, Data bases, Statistical data, Data displays, Graphics, Tables(Data), Air transportation (U)

Estimates of block, airborne and ground delays for route segments flown by United States domestic scheduled airlines operating out of twenty large airports are presented in this document. The data were determined from the CAB ER-596 Service Segment data base, which provides monthly operational times, both ground and airborne, for all route segments receiving scheduled air carrier service. The data in this report are limited to the three-hundred and twenty-five route segments connecting the twenty airports included in the study. Average monthly estimates of the ground and airborne components of block delays, defined as delays encountered from 'ramp to ramp' on a route segment, are presented for the two-year period from 1973-1974. Average monthly estimates of delays for the airborne portion of the segment ('wheels off' to 'wheels on') are categorized according to (1) route segment, (2) airline, (3) aircraft type and (4) local scheduled arrival or departure time.

(U)

AD-A032 526 1/5 1/2
DOUGLAS AIRCRAFT CO LONG BEACH CALIF

Supporting Documentation for Technical Report on Airport Capacity and Delay Studies. (U)

DESCRIPTIVE NOTE: Final rept.
JUN 76 57P
REPT. NO. DAC-88277-Suppl
CONTRACT: DOT-FA72WA-2897
MONITOR: FAA-RD 76-162

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supplement to Rept. no. FAA-RD-76-153, AD-A032 166. Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, Calif., McDonnell Douglas Automation Co., Long Beach, Calif. and American Airlines, Inc., New York, N. Y.
DESCRIPTORS: *Airports, *Air traffic, *Resource management, *Commercial aviation, Civil aviation, Mathematical models, Air traffic control systems, Aircraft landings, Takeoff, Delay, Runways, Capacity(Quantity), Utilization, Scheduling, Planning (U)

This Report contains technical data to supplement the report 'Technical Report on Airport Capacity and Delay Studies.' The report contains supporting documentation of the technical studies leading to the preparation of an airfield capacity and delay handbook for the Federal Aviation Administration. (Author) (U)

AD-A032 260 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF MANAGEMENT SYSTEMS

FAA Air Traffic Activity, Fiscal Year 1976. (U)

DESCRIPTIVE NOTE: Semi-annual rept.,
JUN 76 251P Thompson,George ;Wilson, Patricia ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic control terminal areas, *Air traffic, Routing, Landing fields, Pilots, Aircraft landings (U)
IDENTIFIERS: *Air traffic activity, FAA(Federal aviation administration), Federal aviation administration, Aircraft operations, *Instrument flight rules, *Air routes, Pilots briefing (U)

This report furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service Stations (FSSs), Combined Station Towers (CS/Ts), International Flight Service Stations (IFSSs), and Approach Control Facilities. (Author) (U)

AD-A032 166 1/5 9/2
DOUGLAS AIRCRAFT CO LONG BEACH CALIF

Technical Report on Airport Capacity and Delay Studies. (U)

DESCRIPTIVE NOTE: Final rept.
JUN 76 186P
REPT. NO. DAC-88277
CONTRACT: DOT-FA72WA-2897
MONITOR: FAA-RD 76-153

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, Calif., McDonnell Douglas Automation, Co., Long Beach, Calif. and American Airlines, Inc., New York, N. Y.
DESCRIPTORS: *Airports, *Air traffic, *Resource management, *Computerized simulation, Civil aviation, Mathematical models, Air traffic control systems, Aircraft landings, Takeoff, Delay, Runways, Capacity(Quantity), Utilization, Scheduling, Planning, Computer programs, Validation, Data acquisition, Data processing, Interactive graphics, Fortran, Algorithms, Handbooks (U)

This report contains documentation of the technical studies leading to the preparation of an airfield capacity and delay handbook for the Federal Aviation Administration. The effort was divided into four major areas: (1) Introduction, including definitions of airfield capacity and delay; (2) Airfield capacity and delay models; (3) Validation of capacity and delay models; and (4) Handbook development, including technical studies, presentation concepts, and production. (Author) (U)

AD-A031 924 11/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

An Evaluation of Window Glass for Air Traffic Control Tower Cabs. (U)

DESCRIPTIVE NOTE: Final rept. Mar 74-Aug 75,
OCT 76 45P Paul,Lee ;Bradley,J. Roy ;
Martin,Donald A. ;
REPT. NO. FAA-NA-76-13
PROJ: FAA-081-431-120
MONITOR: FAA-RD 76-105

UNCLASSIFIED REPORT

DESCRIPTORS: *Windows, *Glass, *Air traffic control systems, Optical properties, Visibility, Assessment, Acceptability, Transmissivity, Experimental data, Test facilities, Diurnal variations, Day, Night, Reflectivity, Towers (U)
IDENTIFIERS: *Control tower cabs, Double paned windows (U)

Seven samples of commercially available glass were evaluated to determine their suitability for use in air traffic control tower cabs. Spectral transmissivity measurements were made on each sample for all wavelengths in the visible spectrum. A small experimental tower cab was constructed near the NAFEC airport, and controllers evaluated the samples in the tower cab under day, night, dawn, and dusk viewing conditions. The controller ratings were analyzed and evaluated in terms of the optical transmissivity of the samples and the type of window; i.e., single pane and double pane. There were differences in the ratings of the samples, and the relative merit of the samples depended, in part, on the time of day the ratings were made. An unexpected factor in the ratings was the appearance of internal reflections in the double pane windows at night. Color illustrations reproduced in black and white. (U)

AD-A031 880C 5/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Education as a Factor in the Selection of Air Traffic Controller Trainees, (U)

JUN 76 38P Cobb,Bart B. ;Young,Carol L. ;Rizzuti,Barbara L. ;
REPT. NO. FAA-AM-76-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Personnel selection, *Education, Training, Predictions, Job analysis, Personnel retention, Courses(Education), Careers, Attrition (U)

This longitudinal study of 2,352 air traffic control specialist recruits (1,858 En Route and 494 Terminal) who entered the FAA Academy basic training phase in 1969 examined the validity of educational level, recency of education, and major areas of college study for the prediction of success in air traffic control (ATC) training. All educational variables, both before and after consideration of age effects and pre-FAA experience, were found to be negligibly and/or inversely related to ATC success. College majors listed by 925 of the 1,265 recruits who attended college revealed little potential for prediction of ATC success; even those 53 recruits whose majors were judged to be aviation related had a retention rate of only 56.6 percent compared to the 56.7 percent retention rate of all recruits indicating college work. None of the education variables had a significant interaction effect on the validities of other selection factors. Moreover, all types of aviation-related experience except ATC were found to be unreliable for prediction of training outcomes. (U)

AD-A031 345 17/7 9/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Computer Program Specifications: Volume II. Application Program Specification. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 76 439P
REPT. NO. FAA-RD-76-157-2
PROJ: FAA-111-102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A031 165. Report of the Central Flow Control Design Team.
DESCRIPTORS: *Air traffic control systems, *Computer applications, *Computer programming, Specifications, Instruction manuals, Data bases, Flight paths (U)

This report contains the specifications for the applications programs of the Central Flow Control Computer Program. This report provides a detailed requirements definition and functional specification for each system transaction. The transaction purpose, input data, processing functions, and output are defined and specified in detail. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A031 210 17/7 9/2 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Computer Program Specifications. Volume IV. Data Base Subsystem Specifications. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 76 73P Bales,R. ;Beeker,G. ;
Broglio,C. ;Casey,F. ;Chao,Y. ;
REPT. NO. FAA-RD-76-157-Vol-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 5, AD-A031 167.
DESCRIPTORS: *Air traffic control systems, *Computer programs, Air traffic, Flow, Control, Data bases, Data management, Files(Records), Functions, Specifications, Logic, Commercial aviation, Directories, Aviation safety, Centralized (U)
IDENTIFIERS: Official airline guides, Central Flow Control Computer Program (U)

This report contains the specifications for the data base subsystem of the Central Flow Control Computer Program. This report provides a detailed functional specification of the system's data base management components, and a detailed specification of the data base structure. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A031 180 17/7 9/2 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Computer Program Specifications. Volume III. Off-Line Support Subsystem Specification. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 76 82P Bales,R. ;Beeker,G. ;
Broglio,C. ;Casey,F. ;Chao,Y. ;
REPT. NO. FAA-RD-76-157-Vol-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A031 210.
DESCRIPTORS: *Air traffic control systems, *Computer programs, Air traffic, Centralized, Flow, Off line systems, Logistics support, Data bases, Recording systems, Data acquisition, Data processing, Control, Aviation safety, Commercial aviation (U)
IDENTIFIERS: Central Flow Control Computer Program (U)

This report contains the specifications for the off-line support subsystem of the Central Flow Control Computer Program. This report provides a detailed functional specification of the utility, data recording and analysis, data base support, system build, system test, and management aid software components of the system. (Author) (U)

AD-A031 167 17/7 9/2 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Computer Program Specifications. Volume V. Executive Subsystem Specification. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 76 47P Bales,R. ;Beeker,G. ;
Broglio,C. ;Casey,F. ;Chao,Y. ;
REPT. NO. FAA-RD-76-157-Vol-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A031 210.
DESCRIPTORS: *Air traffic control systems, *Computer programs, Air traffic, Centralized, Flow, Control, Executive control programs, Monitors, Specifications, Error analysis, Aviation safety, Commercial aviation (U)
IDENTIFIERS: Central Flow Control Computer Program (U)

This report contains the specifications for the executive subsystems of the Central Flow Control Computer Program. This report provides a detailed functional specification of the system's resource management, error analysis, reconfiguration, startup and startover, system analysis recording, input/output message, testing, and supervisor call components. (Author) (U)

AD-A031 165 17/7 9/2 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Central Flow Control Computer Program Specifications. Volume I. Introduction to Specification Series; System Overview. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 76 27P Bales,R. ;Beeker,G. ;
Broglio,C. ;Casey,F. ;Chao,Y. ;
REPT. NO. FAA-RD-76-157-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A031 180.
DESCRIPTORS: *Air traffic control systems, *Computerized simulation, *Computer programs, Air traffic, Centralized, Flow, Automation, Airports, Delay, Interfaces, Predictions, Control, Specifications, On line systems, Telecommunication, Aviation safety, Commercial aviation, Real time (U)
IDENTIFIERS: *Airport delay prediction, Central flow control computer program (U)

This report contains an introduction to the specifications for the Central Flow Control Computer Program, and presents an overview of the automated system on which the program functions. This report provides a description of the system application, the data processing configuration, program interfaces, system operations, software capabilities, and the remainder of the specification series. (Author) (U)

AD-A031 151 17/7 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Terminal Information Processing System Concept Testing (Control Tower). (U)

DESCRIPTIVE NOTE: Final rept. Jan-May 75,
SEP 76 42P Rohland,Hamilton T. ;
Rundall,Theodore W. ;Verno,Michael J. ;
REPT. NO. FAA-NA-75-21
PROJ: FAA-142-173-030
MONITOR: FAA-RD 76-143

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Information processing, Airport control towers, Display systems, Automation (U)
IDENTIFIERS: ARTS 3(Automated Radar Terminal Systems), Automated radar terminal systems 3, TIPS(Terminal Information Processing Systems), Terminal information processing systems (U)

Simulations were conducted at the National Aviation Facilities Experimental Center using the Flight Data Distribution System to evaluate two concepts of a Terminal Information Processing System (TIPS) using electronic display of flight information as a replacement for printed paper flight strips in airport traffic control towers associated with high-density Automated Radar Terminal System (ARTS III) facilities. It was concluded that paper flight strips can be replaced successfully by an electronic system. Recommendations were made to remedy those deficiencies that were discovered during the concept testing. (U)

AD-A031 148 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

A Computer Program Functional Design of the Simulation Subsystem of an Automated Central Flow Control System. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Aug 76,
AUG 76 143P Medeiros,Manuel F. ;
MacDonald,Paul M. ;Maglione,Vito P. ;
Wright,Richard D. ;
REPT. NO. TSC-FAA-76-25
MONITOR: FAA-RD 76-144

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Computerized simulation, Air traffic, Automation, Centralized (U)

The report contains a functional design for the simulation subsystem of a future automation concept in support of the ATC Systems Command Center. The simulation subsystem performs airport airborne arrival delay predictions and computes flow control tables for the traffic management of excess airborne delays. Two flow control procedures are supported: Quota Flow and Fuel Advisory Departure procedures. This simulation subsystem works in conjunction with an input subsystem, a centralized data base of national air traffic schedules, a data and flight list retrieval subsystem and a report generator, all of which have been designed by the FAA and reported in separate documentation. (U)

AD-A031 070 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Controller/Computer Interface with an Air-Ground Data Link. (U)

DESCRIPTIVE NOTE: Final rept. Jan-May 75,
JUN 76 150P Hagopian,J. ;Morgan,T. ;
REPT. NO. TSC-FAA-75-23
MONITOR: FAA RD-76-91

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control system analysis, Air traffic controllers, Data links, Digital computers, Voice communications, Digital systems, Message processing, Interfaces (U)

This report describes the results of an experiment for evaluating the controller/computer interface in an ARTS III/M and S system modified for use with a simulated digital data link and a voice link utilizing a computer-generated voice system. A modified ARTS III M and S system at the National Aviation Facilities Experimental Center (NAFEC) provided the means for determining which of three candidate control and display modes was the most suitable for the display and dispatch of computer-generated M and S commands in a mixed voice/digital communications environment. (U)

AD-A030 305 1/5 9/2
FEDERAL AVIATION ADMINISTRATION DES PLAINES ILL GREAT LAKES REGION

O'Hare Delay Task Force Study. Volume III. Technical Appendices. (U)

JUL 76 181P
REPT. NO. FAA-AGL-76-1-Vol-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A030 237.
DESCRIPTORS: *Air traffic control systems, *Landing fields, *Scheduling, *Computerized simulation, Delay, Takeoff, Cost analysis, Traffic, Capacity(Quantity), Queueing theory, Runway (U)
IDENTIFIERS: O'Hare international airport, Airsim computer program, Gatesim computer program, Throughput (U)

This joint FAA/City of Chicago/airline study of air traffic delay at Chicago O'Hare International Airport is presented in three volumes. The first volume is an executive summary of the study findings and recommendations. The second volume is the technical report, covering the findings, conclusions and documentation of the data and methodology utilized in the study. The third volume consists of appendices which contain data and explanatory materials. This study of air traffic delay at Chicago O'Hare International Airport, its causes and potential solutions outlines a comprehensive program of delay reduction measures that have the potential to dramaticaliy reduce the level and cost of delay. The study also quantifies benefits of elements of the upgraded third generation air traffic control system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A030 237 1/5
FEDERAL AVIATION ADMINISTRATION DES PLAINES ILL GREAT LAKES REGION

Delay Task Force Study. Volume I. Executive Summary. (U)

DESCRIPTIVE NOTE: Final rept. Dec 74-Jun 76.
JUL 76 30P
REPT. NO. FAA-AGL-76-1-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-030 172.
DESCRIPTORS: *Air traffic control systems, *Landing fields, Aviation safety, Scheduling, Delay, Takeoff, Separation, Cost analysis, Aviation fuels, Manhours, Flight crews, Air traffic, Visual flight rules (U)
IDENTIFIERS: O'Hare International Airport (U)

This study of air traffic delay at Chicago O'Hare International Airport, it causes and potential solutions has identified no panacea to the problem in the present or future. However, the study does outline a comprehensive program of delay reduction measures which if implemented, has the potential to dramatically reduce the current level and costs of delay. The program will also provide significant future delay reduction benefits regardless of the future air traffic control environment. The potential cost savings outlined are not intended to represent absolutes but rather to point out the most productive directions in which to focus industry action. During the study, several of the delay reduction concepts identified by the Task Force have been tested by the study sponsors with results which parallel those identified in the Task Force evaluations, lending additional credence to the concepts. This publication is a summary version of the final Task Force report which is comprised of three volumes: this Executive Summary, a Technical Report detailing the analyses which led to the recommendations, and a volume of Technical Appendices containing the data and the methodology used in this study. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A030 172 1/5
FEDERAL AVIATION ADMINISTRATION DES PLAINES ILL GREAT LAKES REGION

O'Hare Delay Task Force Study. Volume 2. Technical Report. (U)

DESCRIPTIVE NOTE: Technical rept. Dec 74-Jun 76.
JUL 76 232P
REPT. NO. FAA-AGL-76-1-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A030 237.
DESCRIPTORS: *Air traffic control systems, *Landing fields, *Scheduling, Takeoff, Delay, Separation, Cost analysis, Aviation fuels, Manhours, Flight crews, Air traffic, Visual flight rules, Aviation safety (U)
IDENTIFIERS: O'Hare International Airport (U)

This joint FAA/City of Chicago/Airline study of air traffic delay at Chicago O'Hare International Airport is presented in three volumes. The first volume is an executive summary of the study findings and recommendations. The second volume is the technical report, covering the findings, conclusions and documentation of the data and methodology utilized in the study. The third volume consists of appendices which contain data and explanatory materials. This study of air traffic delay at Chicago O'Hare International Airport, its causes and potential solutions outlines a comprehensive program of delay reduction measures that have the potential to dramatically reduce the level and cost of delay. The study also quantifies benefits of elements of the upgraded third generation air traffic control system. (U)

AD-A030 107 17/9 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evluation Report, Howard AFB, Canal Zone. (U)

DESCRIPTIVE NOTE: Final rept. 31 Mar-15 Apr 76,
AUG 76 78P Buford,Jimmy D. ;
REPT. NO. 76/66C-68

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Airport radar systems, *Air control centers, Area coverage, Search radar, Line of sight, Ultrahigh frequency, Radio links (U)
IDENTIFIERS: AN/MPN-13, TRACALS(Traffic Control and Landing Systems), Traffic control and landing systems, RIVET SWITCH Project, Howard Air Force Base, Panama Canal (U)

A combined Traffic Control and Landing Systems (TRACALS) station evaluation of the AN/MPN-13A radar and the communications system was performed at Howard AFB, C. Z., 31 Mar 76 through 15 Apr 76. The purpose of the evaluation was to define the capabilites and limitations of the air traffic control facilites. This report deals with only the ground/air/ground communication portion of the evaluation. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the GCA and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a discussion of the RIVET SWITCH receiver output levels, receiver squelch circuit adjustments, and RIVET SWITCH receiver transmitter modulation metering circuits. The data and diagrams presented in this report can be used as a guide for anticipated performance of the Communication system at Howard AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented in this report are valid for other locations using the same communications equipment. (Author) (U)

AD-A029 975 17/7
MITRE CORP MCLEAN VA

TCA/ERS Stage III Costs Study, (U)

JUL 76 66P Ditmore,M. A. ;Rucker,R. A. ;
REPT. NO. MTR-7266
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 76-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Sep 74 AD/A001 236.
DESCRIPTORS: *Air traffic control terminal areas, *Air traffic control systems, Cost effectiveness, Collision avoidance, Aviation safety, Cost analysis, Visual flight rules (U)

Terminal Control Areas (TCAs) and Expanded Radar Services (ERS), Stage III, should be very effective in reducing midair collision risks in the busier terminal areas, by converting VFR flights unknown to ATC into known participants in the traffic control process. The report examines the extent to which VFR flights have participated and finds an average of 28%. The costs of providing these services are shown to be predominately labor costs (pro-rated investment costs are estimated to be less than one-half of one year's pro-rated labor costs). (U)

AD-A029 973 17/7 1/5 1/2
MITRE CORP MCLEAN VA

Air Traffic at an Uncontrolled Airport and Expected Alert Rates for Collision Detection Logics. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 76 81P Mundra,A. ;
REPT. NO. MTR-7204
CONTRACT: DOT-FA70WA-2449
MONITOR: FAA-EM 76-5

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Collision avoidance, *Airports, Air traffic, Computer logic, Detection, Mathematical models, Statistical analysis, Warning systems, Automation (U)
IDENTIFIERS: General aviation, Manassas Airport, Traffic patterns (U)

To provide preliminary design data for refinement of the Automated Terminal Services (ATS) concept, a study of airport traffic was initiated. Data were acquired on aircraft behavior in a typical traffic pattern at Manassas Airport: an uncontrolled, primarily general aviation airport. A time step computer model of the multi-aircraft traffic situation was generated. Various statistics of the traffic were extracted and potential collision warning logics exercised to determine alarm rates. The results have implications for both the effectiveness of airborne collision avoidance systems in the traffic pattern and of ground based concepts that include threat detection such as ATS. (U)

AD-A029 846 17/7 5/10
ILLINOIS UNIV AT URBANA-CHAMPAIGN SAVOY AVIATION RESEARCH LAB

Simulator Tests of Pilot Performance in Terminal Area Navigation Operations: Effects of Various Airborne System Characteristics. (U)

DESCRIPTIVE NOTE: Final rept. Oct 74-Jun 76,
MAY 76 163P Jensen,Richard S. ;Marsh, Roger W. ;
CONTRACT: DOT-FA71WA-2574
MONITOR: FAA-RD 76-99

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, *Pilots, *Performance tests, Simulation, Navigation, Turning flight, Performance(Human), Computer applications, Display systems, Approach, Flight paths, Preset guidance, Airborne, Tracking, Flight speeds, Control (U)
IDENTIFIERS: Waypoints, Area navigation (U)

This is the final report of a simulator experiment in which 45 highly experienced pilots made five three-dimensional terminal area navigation flights each on a different parallel course offset. The experiment was designed to assess pilot performance as a function of three turn anticipation techniques (Procedural, Computed, and Electronic Map Display) and three levels of waypoint storage capacity (one, two, and three) on four different parallel course offsets (three and five miles left and right) and centerline. The flight task included SID, STAR, and approach procedures in the simulated Atlantic City area. Performance was measured on four variables: horizontal and vertical tracking, airspeed control, and procedural performance. (U)

AD-A029 713 17/2 1/5 17/2.1 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Communications Station Evaluation Report, Kadena AB, Japan, 4 March - 16 March 1976. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 76 104P Wallachy,Bruce E. ;
REPT. NO. 76/66C-63

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, *Ground to air communications, Ground stations, Very high frequency, Ultrahigh frequency, Radio links, Air Force facilities, Japan (U)
IDENTIFIERS: AN/GRT-18, RIVET SWITCH Project, TRACALS(Traffic Control and Landing System), Traffic Control and Landing System (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at Kadena AB, Japan (1962 Comm Sq) from 4 March through 16 March 1976. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications systems. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the RAPCON and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a discussion of transmitter and receiver frequency accuracy, test equipment, VHF isolators, RAPCON keying system, modification to AN/GRT-18 transmitters, and Rivet Switch receiver output levels. The data and diagrams in this report can be used as guides for anticipated performance of the communications system at Kadena AB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented are valid for other locations using the same communications equipment. (Author) (U)

AD-A029 547 17/2 17/7 1/5
COMPUTER SCIENCES CORP FALLS CHURCH VA

System Design Study for VHF Universal Data Link and DABS Combinations. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 76 325P Blank,Howard A. ;
CONTRACT: DOT-FA-72WA-3072
MONITOR: FAA-RD 76-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Data links, *Radio links, *Discrete address beacon systems, *Air traffic control systems, Very high frequency, Air to surface Message processing, Access, Control (U)

This final report presents the results of a preliminary design of a VHF Universal Data Link System. Also presented are preliminary estimates of the design of the judicious selection of appropriate combinations of VHF Data Link and DABS coverage. The results of the study indicate that a VHF Universal Data Link System will greatly upgrade the capabilities of the current air/ground communication system. The implementation cost and complexity appear favorable when compared to the increased communications benefits. (Author) (U)

AD-A029 486 17/9 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Test and Evaluation of ATCRBS Electronic Scan Antenna (System Test). (U)

DESCRIPTIVE NOTE: Final rept. Jan 73-Jun 75,
AUG 76 55P Bradley,Anthony D. ;
REPT. NO. FAA-NA-75-73
MONITOR: FAA-RD 76-97

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control radar beacon systems, *Radar antennas, *Phased arrays, Electronic scanners, Monopulse radar, Target detection, Airport Radar systems, Radar beacons (U)
IDENTIFIERS: *Electronic scan antennas (U)

The air traffic control radar beacon system (ATCRBS) experimental electronic scan antenna (ESA) consists of 56 array modules placed on a platform (ring) constructed around the top of an airport surveillance radar tower. A shelter beneath the tower provides an enclosure for the control and radiofrequency distribution system of the ESA. This final report covers the system testing to demonstrate the ATCRBS ESA dynamic capabilities in typical terminal environment and to examine beacon monopulse performance. It is concluded that the computer-controlled ATCRBS ESA demonstrated the automated features of the antenna, including agile beam management. In addition, the ATCRBS ESA monopulse target detection system was exercised during the flight test effort. This testing established that the field environment and aircraft maneuvering affected the resulting parameters of system operation (i.e., azimuth accuracy and received signal level) Basic monopulse target detection and processing is feasible for the ATCRBS. (Author) (U)

AD-A028 514 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Test and Evaluation of the Beacon Processing Subsystem of the Automated Radar Terminal System (ARTS III) All-Digital Tracking Level System. (U)

DESCRIPTIVE NOTE: Final rept. Oct 74-Jun 75,
JUL 76 295P Holtz,Martin ;Schoenthal, Mark ;
REPT. NO. FAA-NA-75-46
PROJ: FAA-142-171-010
MONITOR: FAA-RD 76-98

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jan 74, AD-773 711.
DESCRIPTORS: *Air traffic control terminal areas, Data processing, Data transmission systems, Signal processing, Tracking, Digital systems, Radar beacons, Automation (U)
IDENTIFIERS: ARTS 3(Automated Radar Terminal Systems 3), Automated radar terminal systems 3, *Air traffic control radar beacon systems (U)

The report describes the test and evaluation conducted to determine the performance of the beacon processing subsystem (BPS) of the Automated Radar Terminal System (ARTS III) all-digital tracking level system. A test bed was established to perform an evaluation of the level-one ARTS III system in fiscal year 1973. This included development of statistical reduction programs to provide summary data defining system performance. The level-one beacon ARTS III report (FAA-RD-73-182) contains the results and conclusions of that study from which a baseline standard of performance has been established. The test bed and reduction program interface were modified to accommodate the improved beacon data acquisition subsystem (BDAS). Technical tests were conducted using special test equipment to determine the characteristics of the improved BDAS and improved software. These tests included wide pulse detection, garble detection, code validation, processor loading, probability of detection, (U)

AD-A028 296 17/7 4/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Concept and Plan for the Development of a Weather Support Subsystem for Air Traffic Control. (U)

DESCRIPTIVE NOTE: Project rept.,
APR 76 124P Krich,Steven I. ;Sussman, Steven M. ;
REPT. NO. ATC-64
CONTRACT: DOT-FA74WAI-485, F19628-76-C-0002
MONITOR: FAA-RD 76-23

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Meteorological data, Meteorology, Weather forecasting, Weather communications, Data processing equipment, Data displays, Meteorological radar, User needs (U)

The report summarizes the results of a study to: (1) investigate the primary needs of air traffic controllers, flow controllers, and central flow controllers for weather information, (2) define a cost effective system concept to meet these needs, and (3) lay out a plan for the development of the proposed weather subsystem to support Air Traffic Control. The recommended system will provide rapid generation and dissemination of reliable user oriented observations and very short range severe weather forecasts (up to 30 min.) to facilitate controller planning. This new capability will: (1) reduce weather induced controller work load peaks, (2) permit controllers to coordinate and preplan aircraft rerouting for weather avoidance, (3) achieve an improved balance between the inefficiency of overreaction and the essentials of safety, (4) facilitate controller response to pilot requests for weather data on a work load permitting basis, and (5) enable the issuance of accurate weather advisories. The system will also provide rapid generation and dissemination of reliable short range forecasts (up to 4 hours) to permit early introduction of necessary flow control procedures. This new capability will: (1) decrease problems for controllers, (2) increase acceptance of flow control, (U)

AD-A028 044 17/7
MITRE CORP MCLEAN VA

Predictions of Self-Interference in the Air Traffic Control Radar Beacon System. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 76 33P Spencer,N. A. ;
REPT. NO. MTR-7165
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 76-4-Add-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control radar beacon system, *Self noise, Predictions, Transponders, Asynchronous systems, Distortion, Interference (U)
IDENTIFIERS: Fruit(Interference) (U)

Recently interest has been renewed on the likely effects of universal transponder equipage on the Air Traffic Control Radar Beacon System. A review of several studies shows that the impact on asynchronous fruit and reply probability are under control so long as planned improvements (especially new interrogator antennas) are undertaken. A more serious impact is expected to be encountered with synchronous garble. (U)

AD-A027 875 17/9 9/5
TEXAS INSTRUMENTS INC DALLAS EQUIPMENT GROUP

ATCRBS Improvement Program Reflector Antenna Development. (U)

DESCRIPTIVE NOTE: Final rept. Apr 73-Mar 74,
JUN 76 145P Richardson,P. N. ;
CONTRACT: DOT-TSC-602
MONITOR: FAA-RD,TSC 76-90,FAA-76-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Air traffic control radar beacon systems, *Radar beacons, *Radar antennas, *Reflectors, Omnidirectional antennas, Antenna feeds, Gain, Cross polarization, Antenna radiation patterns, Antenna arrays (U)

This report describes the results of a program undertaken by Texas Instruments Incorporated, under contract to the Transportation Systems Center (TSC), to investigate improved antennas for the Air Traffic Control Radar Beacon System (ATCRBS). Under this program, an engineering model of a new ATCRBS reflector antenna system was developed and tested. The antenna system was designed primarily for use in terminal area air traffic control, collocated with an Airport Surveillance Radar (ASR). Also developed during this program was an integral beacon feed for the ARSR-2 radar, to give improved beacon coverage for en-route sites. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A027 281 17/7 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Extended Storage Feature Modifications to the 9020A System. (U)

DESCRIPTIVE NOTE: Final rept. May-Nov 75,
JUN 76 55P Fisher,Donald A. ;Hinkley, Lane G. ;Shaw,Charles R. :
REPT. NO. FAA-NA-76-15
MONITOR: FAA-RD 76-89

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Core storage, *Computer architecture, *Computer program documentation, *Computer programs, Central processing units, Data processing, Modification, Computer programming, Acceptance tests, Costs (U)
IDENTIFIERS: *Computer software, 9020A system (U)

In order to meet the future demands of the Air Traffic Control Upgraded Third Generation System, hardware/software architectural design changes were developed to provide additional core storage and processing capability. These changes, known as the Extended Storage Feature, were implemented in the 9020A System. This report discusses the hardware/software modifications, acceptance tests, and cost considerations involved in implementing this feature. Implementation of the Extended Storage Feature will increase the storage capacity of a 9020A System by 64K words per storage element converted without requiring additional floor space and can be installed without impacting operational activity. (U)

AD-A026 913 17/2
ARMY COMMUNICATIONS COMMAND FORT HUACHUCA ARIZ

Standard Engineering Installation Package. US Army Airfield/Heliport Air/Ground Communications. (U)

MAY 76 368P
REPT. NO. ACC-SEIP-010-C-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Change 1 to Rept. no. ACC-SEIP-010 dated 23 Jan 76.
DESCRIPTORS: *Communication and radio systems, *Landing fields, *Air traffic control systems, *Communication equipment, Aircraft landings, Standards, Installation, Heliports (U)

The US Army Communications-Electronics Engineering Installation Agency (USACEEIA) is responsible for engineering and installing Communications-Electronics (C-E) equipment for the upgrade of Air Traffic Control (ATC) and Navigational and Landing Aids (NAVAIDS) at existing US Army Airfields and Heliports (AAF/AHP) worldwide. The purpose of this Standard Engineering Installation Package (SEIP) is to guide all activities in the selection, acquisition, and installation of air/ground communications equipment for AAF/AHP. (U)

AD-A026 889 17/7 9/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

An Investigation into the Capability of Monitoring the NADIF Antenna. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Jul 75,
JUN 76 45P Talotta,Nicholas J. ;Rogers, Donald E. ;
REPT. NO. FAA-NA-75-62
PROJ: FAA-022-241-030
MONITOR: FAA-RD 76-96

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar antennas, *Radar beacons, *Air traffic control systems, *Air traffic control radar beacon system, Monitoring, Near field, Monitors (U)

A requirement exists to develop a monitoring capability for air traffic control radar beacon system (ATCRBS) ground station equipments. The National Aviation Facilities Experimental Center (NAFEC) has conducted tests of the NAFEC dipole-feed beacon antenna (NADIF antenna) to determine if it can be monitored in the electrical near and far field of the antenna. The data indicate that the antenna can be monitored in the near field on the standard antenna tower, providing the monitor pickup probe is carefully positioned. (U)

AD-A026 880 17/2 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

CommuniCAtions Station Evaluation Report, Norton AFB, Ca, 3-13 February 1976. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 76 73P Buford,Jimmy D. ;
REPT. NO. 76/66C-60

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication equipment, *Air traffic control systems, Landing aids, Aircraft landings, Propagation, Line of sight, Ultrahigh frequency, TACAN, Instrument landings, Climate, Test and evaluation, Air to surface, Surface to air, Solid state electronics (U)
IDENTIFIERS: TRACALS (U)

A combined Traffic Control and Landing Systems (TRACALS) station evaluation of the solid state ILS, TACAN, and communications systems was performed at Norton AFB, CA, 3 through 13 February 1976. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control facilities. The report deals with only the ground/air/ground communications portion of the evaluation. Included in this report are results and analysis of equipment check, loop test line level diagrams for the GCA and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a discussion of the Rivet Switch receiver output levels, receiver squelch circuit adjustments, and Rivet Switch transmitter modulation metering circuits. The data and diagrams presented in this report can be used as a guide for anticipation of the communications system at Norton AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented in this report are valid for other locations using the same communications equipment. (Author) (U)

AD-A026 823 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Ground/Air/Ground Communications Special Evaluation Report, Sheppard AFB, Texas. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 76 100P Wallachy,Bruce E. ;
REPT. NO. 76/66S/59

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, Test and evaluation, Air Force facilities, Texas (U)
IDENTIFIERS: Sheppard Air Force Base, AN/GRR-25, AN/GRR-24 (U)

The purpose of the evaluation was to determine the reasons for and resolve complaints against the ATC communications system. This report summarizes and recommends solutions to problems concerning airfield blind spots, frequency accuracy of receiver equipment, RSU receiver frequency drift, intermittent communications in T-37 training areas, signal generator test equipment, noise interference in VHF frequency spectrum, and AN/GRR-25 versus AN/GRR-24 performance. Other information included specifies coverage data, and equipment performance. The results and tests presented in this report can be used with similar equipment and systems. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A026 753 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY

Terminal Area Forecast - 1977-1987. (U)

JAN 76 335P
REPT. NO. FAA-AVP-76-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Sep 75, AD-A017 095.
DESCRIPTORS: *Civil aviation, *Air traffic, *Forecasting, Airports, Air traffic control terminal areas, Airport control towers, Regions, Management planning and control, Manpower, Equipment, United States (U)

The report contains forecasts for air carrier and air taxi enplanements, air carrier and air taxi aircraft operations, itinerant, total and instrument aircraft operations, and instrument approaches at 872 airports throughout the United States. The airports in this publication include all those with Federal Aviation Administration air traffic control towers and those with air carrier service. The report is intended as an aid for anticipating future manpower and equipment needs at terminal areas. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A026 515 17/7 17/2 9/2
MITRE CORP MCLEAN VA

Multi-Site Intermittent Positive Control Algorithms for the Discrete Address Beacon System. Change 2, (U)

MAY 76 209P McFarland,A. L. ;Patel, K. R. ;Roberts,D. L. ;
REPT. NO. MTR-6742-Ch-2
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-4-Ch-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Change 2 to report dated 30 Sep 74, AD-A001 112. Also includes Change 1.
DESCRIPTORS: *Discrete address beacon systems, *Collision avoidance, *Air traffic control systems, Algorithms, Computers, Subroutines, Message processing, Data links, Flow charting, Data processing (U)
IDENTIFIERS: Uplink, Intermittent positive control (U)

This document presents complete detailed computer algorithms for implementing Intermittent Positive Control (IPC) within a multi-site Discrete Address Beacon System (DABS) network. This document is to be used by the Federal Aviation Administration to specify the IPC system which is to be provided as an integral part of the DABS Phase 2 system by the DABS System Development Contractor. (Author) (U)

AD-A026 392 17/7 9/5 17/9
HAZELTINE CORP GREENLAWN N Y

ATCRBS (Air Traffic Control Radar Beacon System) Antenna Modification Kit. (U)

DESCRIPTIVE NOTE: Final rept. Aug 73-Mar 74, JUN 76 184P Newman,E. M. ;Kendrick,P. ;
CONTRACT: DOT-TSC-598
MONITOR: FAA-RD,TSC 75-40,FAA-75-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Antenna arrays, *Air traffic control systems, *Radar beacons, *Modification kits, Reflectors, Antenna lobes, Reduction (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The report describes the design, fabrication and test results of an improved ATCRBS (Air Traffic Control Radar Beacon System) array antenna for mounting on the reflector of an ASR radar antenna. The antenna consists of a 4-foot high by 26-foot wide array with 252 dipole radiating elements. The structure of the antenna utilizes a specially designed tuned reflector to provide a physically open ground plane which minimizes wind loading while maintaining low backlobe levels. A companion 4-foot high omni antenna, intended for mounting on a pole next to the array, was fabricated and tested, and is also described. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A026 228 17/7
METIS CORP ALEXANDRIA VA

ARTS-III Enhancements Costs and Benefits, (U)

SEP 75 105P Willis,K. ;
CONTRACT: DOT-FA74WA-3494
MONITOR: FAA-AVP 75-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Commercial aviation, *Air traffic control systems, Benefits, Life cycle costs, Cost analysis, Automation, Data processing, Productivity, Computers, Radar tracking, Fail safe, Modular construction (U)

This document presents an analysis of benefits and costs expected to accrue from the ARTS-III Enhancement Program. It defines the sources of benefits both quantifiable and nonquantifiable. The study provides information in present value dollars for the equipment life cycle. Further, it includes a sensitivity analysis of key assumptions and a deferral analysis. A definition is first presented of the various enhancement features. Each major feature is analyzed to determine its quantifiable and nonquantifiable benefits. Benefits are attributable to reduced aircraft delay, increased airport capacity, increased controller productivity, increased aviation safety, and reduced equipment costs. All program costs (provided by FAA) are analyzed and converted to present value costs. A comparison of present value benefits to present value cost is made to determine the benefit/cost ratio. Key parameters were varied to determine the impact or sensitivity of these factors on the ARTS-III Enhancement Program. (Author) (U)

AD-A026 224 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C AIR TRAFFIC SERVICE

Preformance Measurement System for Major Airports. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 75 270P Woods,Bobby J. ;Tobiason, Allan R. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Performance, Performance(Engineering), Standards, Airports, Measurement, Indexes, Weather (U)
IDENTIFIERS: *Airport capacity, Engineered performance standard (U)

This document summarizes the findings and implemented version of the Air Traffic Control Performance Measurement System (PMS) for major airports. Airports covered are Atlanta Hartsfield, Boston Logan, Cleveland Hopkins, Washington National, Denver Stapleton, Dallas Fort Worth Regional, Newark International, John F. Kennedy International, Los Angeles International, LaGuradia, Miami International, O-Hare International, Philadelphia International, Pittsburgh Greater, San Francisco International and St. Louis Lambert. PMS uses as it's standard of measure a quantitatively derived version of airport capacity termed an Engineered Performance Standard (EPS). (Author) (U)

AD-A026 070 1/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ATC/Airborne CAS Compatibility - An Analysis of Field-Derived Data. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Dec 75,
JUN 76 79P Jolitz,Gordon ;
REPT. NO. FAA-NA-76-14
PROJ: FAA-052-241-030
MONITOR: FAA-RD 75-228

UNCLASSIFIED REPORT

DESCRIPTORS: *Aviation safety, *Air traffic control system analysis, Air traffic control systems, Collision avoidance, Interfaces, Compatibility, Hazards, Data processing, Air traffic (U)

Two realtime simulation experiments were conducted at the National Aviation Facilities Experimental Center (NAFEC) for the purpose of investigating the interface between the Air Traffic Control (ATC) system and a proposed Airborne Collision Avoidance System (ACAS). Based on results of those experiments, it was concluded that: (1) Some means of desensitizing the ACAS in the final approach sequencing and spacing zone of busy terminal areas was mandatory, and (2) The concentration of ATC/ACAS interaction would probably vary from site to site. In lieu of further realtime simulation, track history data were recovered from the Washington, Chicago, Los Angeles, and Miami ARTS III facilities. After intermediate processing, the digital representation of the traffic flows were inspected by a software model of the ACAS. Results were reduced in the form of alarm rates, before and after desensitization. Results of the analysis confirmed the conclusion that some form of desensitization would be required. (U)

AD-A025 741 1/2 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C INFORMATION AND STATISTICS DIV

Current Aviation Statistics. Air Traffic Activity. Enroute IFR Air Traffic Survey Peak Day - Fiscal Year 1975. (U)

JUN 76 122P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Report dated Feb 76, AD-A020 550.
DESCRIPTORS: *Air traffic, *Air control centers, Civil aviation, Airports, Statistical data, Peak values, Regulations, Instrument flight, Military aircraft, Tables(Data), Low altitude, Airspeed, Time dependence, Altitude, Allocations, Variations, Air traffic control systems (U)

Air Traffic facilities record daily aircraft operations under low altitude air route control. From these daily records, a facility is able to select the peak day of IFR aircraft handled. Reported are data on aircraft type, air speed, altitude, origin and destination, departure time and date of peak day. Selections from these data are presented in tables on departures by ARTCC and towers. Details of altitudes assigned are shown by both aircraft and engine groupings and also type of user. Departure times are presented by center, by class of user and aircraft type. (U)

AD-A025 427 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Sensor Interactions with ATC Facilities. (U)

DESCRIPTIVE NOTE: Project rept., APR 76 53P Reiner,D. ;Vandevenne,H. F. ;
REPT. NO. ATC-51
CONTRACT: F19628-76-C-0002, DOT-FA72-WAI-261
MONITOR: FAA-RD 75-92

UNCLASSIFIED REPORT

DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, Surveillance, Data links, Pilots, Interactions, Air traffic controllers (U)
IDENTIFIERS: Digital communications, Intermittent positive control (U)

This document presents, on a functional level, the interactions that occur between a DABS sensor and an ATC facility (terminal or enroute) in order to make full use of the capabilities provided by the addition of DABS sensors to the ATC system. There are three functions of the interactions: (1) handle surveillance reports from the DABS site, (2) handle the two-way digital communications messages between pilots and controllers, and (3) handle a variety of control data messages between the two sites. For each kind of interaction, the actions taken by the DABS sensor are summarized, the messages involved in the transaction are defined, and suggestions are made concerning possible appropriate actions by the ATC facility. The latter include message generation and display, data processing, and controller and system manager activities. (Author) (U)

AD-A025 426 1/2 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Physiological, Subjective, and Performance Correlates of Reported Boredom and Monotony while Performing a Simulated Radar Control Task. (U)

AUG 75 12P Thackray,Richard I. ;Bailey, J. Powell ;Touchstone,R. Mark ;
REPT. NO. FAA-AM-75-8
PROJ: FAA-AM-C-75-PSY-48

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Boredom, Stress(Psychology), Performance(Human), Heart, Humans, Males, Psychological tests, Simulation, Physiological effects, Attention, Response(Biology), Automation, Vigilance (U)

Forty-five male subjects performed a simulated air traffic control radar task for 1 hour. Subjects were equally divided into three time-of-day groups and tested at 1000, 1300, and 1530. The subject's task was to respond as rapidly as possible to infrequent changes in alphanumeric symbols. Physiological recordings of blood pressure, oral temperature, skin conductance, body movement, heart rate and heart-rate variability, and performance measures of mean response latency and variability of response latencies were obtained. In addition, subjects rated their levels of boredom, monotony, irritation, attentiveness, fatigue, and strain at the beginning and end of the session. There were no differences between any of the time-of-day groups except in oral temperature, which was significantly higher in the afternoon than in the morning. Two extreme groups of eight subjects each were formed on the basis of their rated boredom and monotony and compared with respect to changes in each of the measures during the task period. The two groups differed significantly on several measures, with the high boredom-monotony group showing greater increases in 'long response times,' heart-rate variability, and strain along with a greater decrease in attentiveness. (U)

AD-A025 236 1/2 1/5 17/7
QUINBY (GILBERT F) FORT WASHINGTON PA

Upgraded Third Generation (UG 3rd) Air Traffic Control System. Impressions and Impact on General Aviation. (U)

DESCRIPTIVE NOTE: Final rept., APR 76 48P Quinby,Gilbert F. ;
CONTRACT: W1-76-1453-1
MONITOR: FAA-RD 76-81

UNCLASSIFIED REPORT

DESCRIPTORS: *Civil aviation, *Air traffic control systems, Discrete address beacon systems, Aviation safety, Collision avoidance, Radio navigation, Microwave landing systems, Automation, Air traffic control terminal areas, Wake, Vortices, Ground support equipment, Attitudes(Psychology), Questionnaires (U)
IDENTIFIERS: *General aviation, Upgraded third generation (U)

Interviews were conducted with seven General Aviation Organizations on the subject of the Upgraded Third Generation System of Air Traffic Control. Spokesmen for General Aviation had a good understanding of the functions and the characteristics of the Upgraded Third Generation ATC System, particularly in those areas of serious interest to General Aviation System Users. With a few exceptions, such as the need for improved weather detection and reporting and other flight services, it appeared that the provisions of the existing generation of Air Traffic Control is reasonably adequate to the present requirements of General Aviation Users. All spokesmen, however, anticipate substantial growth in the demands imposed on the system over the next decade and agree that some improvements in capacity and safety are needed. The report includes a series of matrices showing the degree of importance attached by each segment of General Aviation interviewed to each of the major elements of the Upgraded Third Generation Air Traffic Control System. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A025 235 17/7 17/2 9/2
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ATC (NAFEC). Volume V. Digital Simulation Facility Configuration, (U)

DEC 75 28P Westcott,Royal A. ;
REPT. NO. MTR-4221-Vol-5
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-159-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-A025 234.
DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, Data transmission systems, Interfaces, Simulation, Models, Test facilities, Surveillance, Communication terminals, Data processing equipment, Digital systems, Modems, Digitizers (U)

This document defines the hardware interfaces between the Digital Simulation Facility (DSF) and the Air Traffic Control (ATC) facilities at NAFEC. These configurations will be used in tests that require the DSF to simulate the DABS Engineering Models. The interfaces between the DABS Engineering models and the ATC facilities are described in other volumes of this report. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A025 234 17/7 17/2 9/2
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ATC (NAFEC). Terminal Hardware Configuration. Volume IV, (U)

NOV 75 45P Westcott,Royal A. ;
REPT. NO. MTR-4221-Vol-4
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 75-159-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A013 811 and Volume 5, AD-025 235.
DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, Communication terminals, Data links, Transmission lines, Interfaces, Test facilities, Models, Modems, Multiplexing, Computers, Data processing equipment, Formats (U)

This document describes the hardware interfaces required between the Discrete Address Beacon System (DABS) Engineering Models, to be installed at or near the National Aviation Facilities Experimental Center (NAFEC), and the Terminal Automation Test Facility (TATF) at NAFEC. This interface will be used to support DABS development tests and the Upgraded Third Generation System Tests including the Intermittent Positive Control (IPC) Phase II tests. (Author) (U)

AD-A025 233 17/7 17/2 9/2
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ATC (NAFEC). Digital Simulation Facility Data Formats. Volume II. Series 3, (U)

DEC 75 39P Westcott,Royal A. ;
REPT. NO. MTR-4221-Vol-2-Ser-3
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-159-2-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2 Series 1, AD-A013 810 and Volume 3, AD-A013 811.
DESCRIPTORS: *Discrete address beacon systems, *Air traffic control systems, Data links, Data processing equipment, Formats, Interfaces, Models, Simulation, Digital systems, Communications traffic, Downlink, Surveillance, Test facilities, Message processing (U)
IDENTIFIERS: Uplink (U)

This document describes the formats of the simulated surveillance and communications messages for the interface between the Digital Simulation Facility (DSF) and the Air Traffic Control (ATC) facilities at NAFEC. The facilities which will be interfaced with the DSF are the NAS Enroute System in the System Support Facility (SSF) and the ARTS 3 System in the Terminal Automation Test Facility (TATF). These interfaces will be made available for use for IPC Phase 2 testing and other advanced ATC system test activities requiring the simulation of the Discrete Address Beacon System in the DSF. (Author) (U)

AD-A025 152 17/2 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C

Integrated National Airspace Communication System (INACS) for the Support of Air Traffic Control Gross Cost/Benefit Analysis. (U)

APR 76 59P
REPT. NO. FAA-INACS-061-221-CB

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Rept. no. FAA-INACS-061-221-P1, AD-A015 823.
DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, Cost benefits, Advanced systems, Costs, Integrated systems (U)

This report presents the methodology and the results of a comparison of the gross costs of the present day communications system (projected) and the Integrated National Airspace Communications System (INACS) for the period 1982 through 1996. The INACS cost inputs to have been derived for a system (INACS) which is only in a concept stage. System specifications have not yet been prepared. The projected INACS costs have been structured to permit a near direct cost comparison with like subsystem elements in the present system. The summary of present day system communication costs projected from 1974 through the year 2001 was provided by the Policy Analysis Division, AVP-200, Office of Aviation Policy. The cost estimates presented are subject to change, refinement, and validation by cost benefit analyses work to be conducted under Phase I of the INACS program as set forth in the document FAA-INACS-061-221-P1, dated October 1, 1975, titled, 'INACS Phase 1 Program Plan.' The primary objective of this report is to present data to permit an Agency decision as to the feasibility of implementing the Phase 1 activities proposed under the INACS program. (Author) (U)

AD-A024 954 17/9 13/1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Plan View Display (PVD) Background Lighting. (U)

DESCRIPTIVE NOTE: Final rept. Nov 74-Dec 75,
MAY 76 63P Gustafson,Philip C. ;
Aschenbach,John ;Sulzer,Richard L. ;
REPT. NO. FAA-NA-76-3
MONITOR: FAA-RD 76-46

UNCLASSIFIED REPORT

DESCRIPTORS: *Plan position indicators, *Air traffic control radar beacon, Lighting equipment, Background, Air traffic controllers, Cathode ray tubes, Viewers, Stress(Physiology), Radar beacons (U)

Controllers at air route traffic control centers (ARTCC's) have complained that display information on plan view displays (PVD's) causes eyestrain and headaches after a prolonged period of controlling traffic. The controllers indicated that background brightness level similar to the type previously experienced for raster-scanned displays might be a remedy. Therefore, an investigation and evaluation of several methods of generating a uniform background brightness on the PVD were conducted. Results show that the defocused raster method is the most effective and practical type of background brightness generation to be considered for field evaluation. The etched-surface cathode-ray tube also tended to produce a more uniform background illumination than most techniques investigated. This report is a survey of several methods to generate a uniform background brightness on the face of a plan view display (PVD) in an air route traffic control center (ARTCC). The background brightness is intended to offset the undesirable PVD characteristics of high contrast and front surface reflections, which is annoying to the vision of the air traffic controlers. (Author) (U)

AD-A024 787 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. TACAN Station Evaluation Report. Mather AFB, California, 16-26 September 1975 - 2-5 February 1976. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 76 80P Mason,Kenneth G. ;
REPT. NO. 76/66T/54

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, TACAN, Air Force facilities, Antennas, Very high frequency, Ultrahigh frequency, Performance(Engineering), California (U)
IDENTIFIERS: Mather Air Force Base, AN/GRN-19A, AN/GRN-19 (U)

The report contains results of the AN/GRN-19A TACAN station evaluation conducted at Mather AFB, Ca, during the period 16 - 26 September 1975. Also described briefly are findings of a follow-up visit on 2 - 5 February 1976. Since the antenna failed immediately after initial evaluation, a follow-up visit was made to revalidate the data from the first evaluation and to analyze the effects of different antennas on a facility. The TACAN was found to be providing solid coverage throughtout the required service volume except for minor course aberrations and a ten degree restricted area beyond 20 NM below 6500 feet along the 180 deg. radial. Taken together, the ground and the flight evaluation results fully define the capabilities and limitations of the TACAN. The data presented in this report can be used as a valid guide to anticipated performance until there is a significant change in the ground equipment or until a change occurs in the horizon screening. (U)

AD-A024 567 17/2 9/2 5/5 5/8
MANNED SYSTEMS SCIENCES INC NORTHRIDGE CALIF

A Computer Model for Command and Control Analysis. (U)

DESCRIPTIVE NOTE: Technical rept.,
NOV 75 54P Obermayer,Richard W. ;
CONTRACT: N00014-74-C-0324
PROJ: RTW31, NR-274-244

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A023 871.
DESCRIPTORS: *Command and control systems, *Computer programs, *Air control centers, *Human factors engineering, Mathematical models, Aircraft carriers, Air traffic control systems, Man machine systems, Performance(Human), Manned, Simulation languages, Systems analysis (U)
IDENTIFIERS: General purpose system simulator language (U)

One approach to the evaluation of manned systems and their command and control elements is direct empirical observation. However, direct measurement, and especially the analytic study of system variables by systematically altering conditions within a manned system, are often either impractical or can be performed to only a limited degree. A model of the system which allows the variations needed for assessment of a command and control element may therefore be an effective alternative, and a computer model for such purposes is sought in this paper. The purpose of this paper is to report the development of this model, using the General Purpose System Simulator (GPSS) language in the construction of an example simulation of a Carrier Air Traffic Control Center (CATCC), and to present techniques and guidelines for constructing similar models of other manned systems. (Author) (U)

AD-A024 548 17/7
GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL ENGINEERING

FAA Lightning Protection Study: Circuit Modifications for Mark III Instrument Landing System to Prevent Operational Upsets Due to Electrical Transients on Cables. (U)

DESCRIPTIVE NOTE: Final rept. 15 Aug 75-1 Feb 76,
FEB 76 150P Huddleston,Gene K. ;
CONTRACT: DOT-FA72WAI-356
PROJ: AF-9567
MONITOR: FAA-RD 76-61

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rome Air Development Center, Griffiss AFB, N.Y.
DESCRIPTORS: *Air traffic control systems, *Instrument landings, *Surges, Lightning, Electric cables, Electromagnetic pulses, Transient radiation effects, Electrical loads, Circuit analysis (U)
IDENTIFIERS: *Instrument landing systems, Mark-3 instrument landing systems, *Lightning protection (U)

The circuits of the Mark 3 Instrument Landing System which are susceptible to false actuation due to electrical transients on interconnecting electrical cables are identified. The effects of the transients on system operation are analyzed. The circuit modifications required to prevent operational upsets due to transients are presented. The points of entry of surges on AC power lines in the system are identified. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A024 529 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report. Kincheloe AFB, Michigan. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 76 118P Smith,David E. ;
REPT. NO. 75/66R-50

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control radar beacon, *Airport radar systems, *Ground controlled approach radar, Search radar, Radar tracking, Area coverage, Propagation, Radar interference, Climate, Michigan, Test and evaluation (U)
IDENTIFIERS. AN/TPX-42, AN/MPN-14H, Precision approach radar, TRACALS project (U)

This traffic control and landing systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the mobile radar approach control (MRAPCON) facility at Kincheloe AFB, Mi. The data presented in this report were collected during two evaluation periods, 22 October thru 16 November 1975 and 8 thru 16 December 1975. The Kincheloe facility is comprised of an AN/MPN-14H which consists of an air surveillance radar (ASR), precision approach radar (PAR), and associated power systems. The AN/TPX-42(A)V type II air traffic control radar beacon system (ATCRBS) modification is also incorporated into the MRAPCON system. This report included descriptions of the useable radar coverage, the radar coverage diagrams, the ATCRBS coverage and tracking capabilities, the analysis of flight and equipment performance data, and the performance predictions for the MRAPCON facility. The data presented in this report are a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A024 528 17/9 17/7 1/5
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report. Luke AFB, Arizona. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 76 94P Renairi,Richard C. ;
REPT. NO. 76/66R-58

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Air traffic control radar beacon, *Airport radar systems, *Ground controlled approach radar, Search radar, Radar tracking, Area coverage, Propagation, Radar interference, Climate, Arizona, Test and evaluation (U)
IDENTIFIERS: AN/GPN-12, AN/FPN-16, AN/TPX-42, Precision approach radar, TRACALS project (U)

This report contains the results of a radar station evaluation performed on the AN/GPN-12 Airport Surveillance Radar (ASR), the AN/TPX-42 air traffic control radar beacon system (ATCRBS), and the AN/FPN-16 precision approach radar (PAR) at Luke AFB, Arizona. The evaluation took place between 23 Jan and 2 Feb 76. The report documents equipment capabilities and limitations and makes predictions on future equipment performance. The data presented in this report is a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a change occurs in the horizontal profile. (Author) (U)

AD-A024 471 17/7 17/2 9/4
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Modulation and Coding Design - A Summary. (U)

DESCRIPTIVE NOTE: Project rept., MAR 76 106P Goblick,T. J. ;
REPT. NO. ATC-52
CONTRACT: F19628-76-C-0002, DOT-FA72-WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 75-93

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Discrete address beacon systems, *Data links, Modulation, Coding, Transponders, Costs, Electromagnetic compatibility, Electromagnetic interference, Signal processing, Air traffic control radar beacon system, TACAN, Downlink, Replacement (U)
IDENTIFIERS: Uplink (U)

The Discrete Address Beacon System (DABS) has been designed as an evolutionary replacement for the Air Traffic Control Radar Beacon System (ATCRBS). As with ATCRBS, DABS is a cooperative Air Traffic Surveillance System utilizing ground based sensors (interrogators) and airborne transponders. In addition to its surveillance function, DABS integrally accommodates ground-to-air and air-to-ground data link communication within the interrogations and replies. In DABS, each aircraft transponder may be individually interrogated, using its unique 24-bit address, giving the ground based interrogators freedom to schedule interrogations and replies to make efficient use of the channels essentially independent of the aircraft traffic distribution. The evolutionary constraint on DABS, requiring the capability for one-for-one replacement of ATCRBS ground sensors and transponders, dictated the need to maximize commonality between the two systems. This report presents the rationale for the selection of DABS signalling waveforms and error control techniques. (U)

AD-A024 428 17/2.1 1/5 20/14
IIT RESEARCH INST ANNAPOLIS MD

Automated VHF Frequency Assignment System (FAS) for FAA Air Traffic Control Communications. (U)

DESCRIPTIVE NOTE: Final rept., FEB 76 98P Hensler,Thomas ;
CONTRACT: F19628-76-C-0017, DOT-FA70WAI-175
PROJ: AF-649E
MONITOR: ECAC,FAA-RD PR-76-005,76-14

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Updates Rept. no. FAA-RD-73-184, AD-779 086.
DESCRIPTORS: *Frequency allocation, *Air traffic control systems, Very high frequency, Game theory, Automatic, Computerized simulation, Message processing, Traffic, Radiofrequency interference (U)
IDENTIFIERS: FAS(Frequency assignment system), Frequency assignment system, Violations, Communication channels, Channel separation, Spectrum management (U)

An automated frequency assignment system (FAS) was developed as a means of providing frequency assignment plans for FAA Air Traffic Control (ATC) VHF communications facilities. The FAS consists of a series of computer models (described herein). Examples are included of how the model inputs can be varied to investigate the advantages of different assignment procedures. The system can be used for assignment gaming, including partial and complete assignments, detecting violators, statistical analyses, and plots of service volume. (U)

AD-A024 372 17/7 9/2
TRW SYSTEMS GROUP REDONDO BEACH CALIF

Enroute Air Traffic Control Program Software Optimization Study. (U)

DESCRIPTIVE NOTE: Final rept., JUN 75 379P Morrison,David D. ;Richard, Bruce K. ;Parmenter,Mary ;Lindgren,Britta ; Tarnove,Ivin ;
REPT. NO. TRW-25629.000
CONTRACT: DOT-FA74WA-3458
MONITOR: FAA-RD 75-88

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Computer programming, Systems engineering, Optimization, Planning, Algorithms, Coding, Data bases, Efficiency (U)
IDENTIFIERS: Project planning, Most Project-12 (U)

A study of the NAS Enroute computer program was made to determine the efficiency of the current code and to suggest ways of improving the program. The problem was divided into several areas to study improvements in the monitor, the data base, the mathematical algorithms, the program structure, and local code optimization. The results indicated that the program can be significantly improved. In another part of the study a typical program segment was selected, redesigned and recoded. The redesigned program was smaller, simpler, faster and more accurate. The recommendation of the study is that the NAS program be completely redeveloped. If this is not done, the study recommends improving the program by redeveloping large program segments and redesigning portions of the data base. Lesser improvements can be made by structural changes, local code optimization, and documentation improvements. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A024 371 17/7
IIT RESEARCH INST ANNAPOLIS MD

FAA VHF Air/Ground Data Link and Flight Service System Communications Analysis. (U)

DESCRIPTIVE NOTE: Final rept., MAR 76 35P Atwell,Frank ;
CONTRACT: F19628-76-C-0017
PROJ: AF-649E
MONITOR: ECAC,FAA-RD PR-76-014,76-38

UNCLASSIFIED REPORT

DESCRIPTORS: *Direction finding stations, *Air traffic control systems, *Data links, Air traffic control system analysis, Line of sight, Navigation reference, Area coverage, Data acquisition (U)

This report documents the procedures and rationale used to produce overlays which depict line-of-sight coverage diagrams for Federal Aviation Administration (FAA) sites within the conterminous United States and printouts which indicate minimum reception altitudes for selected areas. The overlays and diagrams were submitted to the FAA in support of its Air/Ground Data Link and Flight Service System modernization programs. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A024 328 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C INFORMATION AND STATISTICS DIV

FAA Air Traffic Activity, Calendar Year 1975 and Terminal Area Relationships, Fiscal Year 1975, (U)

DEC 75 291P Thompson,George ;Wilson, Patricia ;
REPT. NO. FAA-AMS-220

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 75, AD-A017 055.
DESCRIPTORS: *Air traffic, *Civil aviation, Statistical data, Air traffic control systems, Towers, Airports, Approach, Instrument landings, Instrument flight, Visual flight rules, Air transportation, Management planning and control (U)

The report furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service Stations (FSSs), Combined Station Towers (CS/Ts), International Flight Service Stations (IFSSs), and Approach Control Facilities. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A024 212 1/5 17/7 1/2
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT PARIS (FRANCE)

Plans and Developments for Air Traffic Systems. (U)

DESCRIPTIVE NOTE: Conference proceedings,
FEB 76 553P Benoit,A. ;Israel,D. R. ;
REPT. NO. AGARD-CP-188

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NATO furnished. Presented at the Symposium of the Guidance and Control Panel (20th held in Cambridge, Mass., 20-23 May 75.
DESCRIPTORS: *Air traffic control systems, *Aircraft landings, *Navigation, Symposia, Automation, Surveillance, Flight control systems, Systems analysis, Performance(Engineering), Airports, NATO (U)

These Proceedings include the papers presented at a Symposium of the AGARD Guidance and Control Panel, Held in Cambridge, Massachusetts, USA, 20-23 May 1975. Forty papers were presented on the following topics: Navigation, Surveillance, Automation, Airport Capacity and Surface Surveillance, Approach and Landing, Advanced Concepts and System Performance Measures. The proceedings include Discussions, a Conference Overview and Closing Remarks. (Author) (U)

AD-A023 810 1/2 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Rationale for Improving the Protection against Midair Collisions. Volume I. Summary. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 75 31P Israel,David R. ;Bock, Richard F. ;Brennan,John L. ;Johnston,Thomas M. ;Jolitz,Gordon ;
REPT. NO. FAA-ED-75-1-Vol-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Aviation safety, *Collision avoidance, *Air traffic control systems, Effectiveness, Optimization, Planning, Cost estimates, Aviation accidents, Prevention, Civil aviation, Air traffic control radar beacon system, Interrogator transmitters, Transponders, Airborne, Altitude, Coding, Backup systems, Compatibility, Regulations (U)
IDENTIFIERS: Midair collisions, DABS(Discrete Address Beacon System), Discrete address beacon system (U)

The existing surveillance-based air traffic control system has been effective in preventing midair collisions, especially those involving air carrier aircraft. Improvements in this effectiveness can be achieved, in the short-term, thorugh mandatory carriage of altitude-encoding beacon (ATCRBS) transponders. To achieve the desired major improvements in collision prevention for public air transportation requires the addition of an independent backup capability to the primary ground-based system and a new capability beyond the limits of its surveillance coverage. These can be best achieved in the mid-term by an airborne BCAS system based on the mandatory carriage of altitude-encoding transponders. The BCAS design should permit a longerterm upgrading to the compatible DABS transponder and implementation of IPC in at least the dense traffic areas. (U)

AD-A023 533 1/2 17/7
CALIFORNIA UNIV BERKELEY INST OF TRANSPORTATION AND TRAFFIC ENGINEERING

Models for Estimating the Number of Conflicts Perceived by Air Traffic Controllers. (U)

DESCRIPTIVE NOTE: Special rept.,
DEC 73 150P Dunlay,William J. ; Horonjeff,Robert ;Kanafani,Adib ;
CONTRACT: DOT-FA72WA-2827

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic, *Air traffic control systems, Separation, Standards, Hazards, Models, Estimates, Conflict, Statistical processes (U)
IDENTIFIERS: Aircraft separation standards (U)

This research seeks to define and estimate the frequency of aircraft interactions (called conflicts) which entail controller intervention. The task of conflict detection is viewed as a stimulus-response process in which the strength of stimulation is a particular closest-approach separation between aircraft, and the corresponding probability of response is the fraction of times controllers judge that separation to be a potential violation of the 5 nautical mile minimum separation standard. Data from human-factors studies of air traffic control are used to estimate response probabilities for a wide range of closest-approach separations. Two empirical models are derived for estimating the number of conflicts. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A023 504 17/7 17/9
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

An Analysis of Radio Frequency Surveillance Systems for Air Traffic Control. Volume II. Appendixes. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-May 75, FEB 76 75P Kleiman, Louis A. ;
REPT. NO. TSG-FAA-75-10-Vol-2
MONITOR: FAA-RD 76-20-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Doctoral thesis. See also Volume 1, AD-A023 503.
DESCRIPTORS: *Air traffic control radar beacon system, Antenna radiation patterns, Radiofrequency, Surveillance, Least squares method, Reflection, Theses, Models, Digital computers, Matrices(Mathematics) (U)
IDENTIFIERS: CDC 6600 computers (U)

Contents: Procedure to determine a least-squares fit for antenna patterns; derivation of magnetude and phase of the complex reflection coefficient; and radiation patterns used in applications of the models. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A023 503 17/7 17/9
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

An Analysis of Radio Frequency Surveillance Systems for Air Traffic Control. Volume I. Text. (U)

DESCRIPTIVE NOTE: Final rept. Sep 74-May 75, FEB 76 225P Kleiman, Louis A. ;
REPT. NO. TSC-FAA-75-10-Vol-1
MONITOR: FAA-RD 76-20-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Doctoral thesis. See also Volume 2, AD-A023 504.
DESCRIPTORS: *Air traffic control radar beacon system, Air traffic controllers, Data displays, Computerized simulation, Models, Surveillance, Radiofrequency, Theses, Propagation, Flight testing, Antenna radiation patterns, Suppression, Least squares method (U)

Performance criteria that afford quantitative evaluation of a variety of current and proposed configurations of the Air Traffic Control Radar Beacon System (ATCRBS) are described in detail. Two analytic system models are developed to allow application of these performance criteria. A simple system model, based on the assumption of a flat earth, enables closed-form analytic expressions for some of the performance criteria to be developed for a wide range of desired areas of coverage. An extremely accurate complex system model provides a tool for simulation of operating characteristics that would be observed in the course of actual flight tests. The complex model includes a new solution for the grazing angle of radiation over a spherical earth that is shown to be more accurate than the commonly-used solution of Fishback. Applications and limitations of both models in the evaluation of four new ATCRBS antennas and of the proposed receiver side-lobe suppression feature are discussed. Both numerical results and a computer-generated representation of an air traffic controller's display are presented. (Author) (U)

AD-A023 247 17/9 17/3 1/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Optimum Elevation Angle Estimation in the Presence of Ground Reflection Multipath. (U)

DESCRIPTIVE NOTE: Technical note,
FEB 76 76P McAulay,Robert J. ;
REPT. NO. TN-1976-11
CONTRACT: F19628-76-C-0002
PROJ: AF-649L
MONITOR: ESD TR-76-35

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Radio interferometers, Air traffic control systems, Direction finding, Elevation, Angles, Signal to noise ratio, Multipath transmission, Dipole antennas, Radar antennas (U)
IDENTIFIERS: Ambiguities, PALM(Precision altitude and landing monitor), Precision altitude and landing monitor (U)

Radars that are developed for the purpose of monitoring aircraft landings in the terminal Air Traffic Control system can be designed to exploit the relatively high signal-to-noise ratio that characterizes the power budgets calculated for such a link. An interferometer using a pair of low gain antennas can be used to obtain passive coverage over a large azimuth and elevation sector. A large base line can be used to obtain the desired elevation angle estimation accuracy. An optimal tradeoff between the width of the subarray aperture and the width of the interferometer base line is performed that achieves a specified elevation angle estimation error while minimizing the overall height of the interferometer configuration. The algorithm searches through the class of antenna patterns that can be synthesized from so-called finite impulse, linear phase digital filters. In Part II, the design of a separate sensor for resolving the interferometer ambiguities is formulated as a hypothesis testing problem and solved using statistical decision theory. A bound on the probability of an ambiguity error is derived that accounts for the effects of ground reflection multipath and receiver noise. (U)

AD-A023 247

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A023 230 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Area Navigation High-Altitude Network Study. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Jun 74,
FEB 76 310P Halverson,Arthur G. ;
Woodson,Floyd B. ;Soper,Richard W. ;Arch, Henry L. ;
REPT. NO. FAA-NA-75-41
PROJ: FAA-044-326-010
MONITOR: FAA-RD 76-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Navigation, Air traffic, Routing, High altitude, Networks, Systems engineering (U)
IDENTIFIERS: *Area navigation, National airspace system (U)

A high-altitude area navigation (RNAV) network study was conducted at the National Aviation Facilities Experimental Center (NAFEC) in order to (1) apply and evaluate the FAA/ Industry RNAV Task Force concepts for RNAV route structures in the high-altitude airspace, (2) offer alternative approaches, where appropriate, and (3) derive data relative to the potential benefits to the air traffic control (ATC) system and to its users by the implementation of RNAV. For design purposes, the enroute structure was based on the requirements for an all-RNAV high-altitude environment starting in 1977. Route structures were evaluated through fast time simulation of a mixed RNAV/VOR environment, with traffic samples representing projected traffic densities for the pre-1977, 1977-1982, and post-1982 time periods with varying mixes of RNAV-equipped aircraft. Alternative route structure design principles were developed which differed from the RNAV Task Force concepts in (1) the configuration of arrival and departure routing into and out of terminal areas, (2) the use of one-way routes, (3) the use of charted routes versus provision for noncharted offset tracks. (U)

AD-A023 230

UNCLASSIFIED Z0M08

AD-A023 035 17/7 1/4
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Beacon CAS (BCAS) An Integrated Air/ Ground Collision Avoidance System. (U)

DESCRIPTIVE NOTE: Project rept., MAR 76 22P Orlando,V. A. ;Welch,J. D. ;
REPT. NO. ATC-62
CONTRACT: F19628-76-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 76-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Collision avoidance, *Air traffic control radar beacon systems, Integrated systems, Avionics, Air to surface, Data links, Airborne, Interrogation, Transponders (U)
IDENTIFIERS: Beacon collision avoidance system (U)

BCAS is a DABS-based airborne collision avoidance system that exploits the features of DABS discrete addressing and integral data link. This provides for a CAS with the unique capabilities of (1) cooperative threat resolution between BCAS and conflicting aircraft through the transmission of maneuver intent (to DABS-only aircraft) and tie breaking (with other BCAS aircraft) and (2) coordination of CAS activides with the ground ATC control function through the DABS air-ground-air data link. All beacon-equipped aircraft in the vicinity of the BCAS are detected. ATCRBS-equipped aircraft are interrogated using a special Mode C interrogation. DABS aircraft are detected passively through periodic squitters emitted by all DABS transponders. Squitter-detected aircraft are tracked on altitude and only those aircraft that represent a co-altitude threat are discretely interrogated to establish a range/ altitude track. The use of discrete addressing eliminates synchronous garble for the BCAS in the same manner as for DABS. This document provides a general description of BCAS from the viewpoint of its operational features and then describes the avionics package required to achieve this capability. (Author) (U)

AD-A022 993 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Area Navigation High Altitude Payoff Analysis Enroute Fast Time Simulation Results. (U)

DESCRIPTIVE NOTE: Final rept. Jan 73-Sep 75, DEC 75 550P Cassell,Ricardo ;
REPT. NO. FAA-RD-76-26
PROJ: FAA-044-326

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Sep 74, AD-787 432.
DESCRIPTORS: *Navigation, *Routing, *High altitude, *Air traffic control systems, Simulation, Trends, Systems analysis, Data bases, Conflict, Test methods (U)
IDENTIFIERS: *Area navigation (U)

A series of fast time simulations of high altitude route structures were conducted as a part of the FAA Area Navigation Engineering and Development Program Plan. This report presents the results of these simulations and supersedes the Preliminary Fast Time Simulation Results Report dated August, 1974. System/user payoff conclusions are presented based on the results of the simulations and observations by the author. While the limitations of fast time simulation resulting from the lack of controller intervention effects are recognized, the simulation techniques employed provide, as a minimum, a substantial basis for the identification of well marked trends and a sizeable data base upon which a reasonable degree of confidence can be placed. (U)

AD-A022 647 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO .

TRACALS Evaluation Report. Communications Station Evaluation Report, MacDill AFB, Florida. (U)

DESCRIPTIVE NOTE: Final rept. Nov 75,
MAR 76 70P Buford,Jimmy D. ;
REPT. NO. 75/66C-56

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Air Force facilities, Florida, Performance(Engineering) (U)
IDENTIFIERS: MacDill Air Force Base (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station Evaluation was performed at MacDill AFB, FL, (1928 Comm Gp) 12 through 21 November 1975. The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communications system. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the GCA and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a discussion of the Rivet Switch receiver output levels, receiver squelch circuit adjustments, and Rivet Switch transmitter modulation metering circuits. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications system at MacDill AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented in this report are valid for other locations using the same communications equipment. (U)

AD-A022 355 17/7 5/8
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of Terminal Information Processing System Concept I for Instrument Flight Rules Room. (U)

DESCRIPTIVE NOTE: Final rept. Apr-Jun 75,
FEB 76 40P Rundall,Theodore ;
REPT. NO. FAA-NA-75-50
PROJ: FAA-142-173-020
MONITOR: FAA-RD 75-184

UNCLASSIFIED REPORT

DESCRIPTORS: *Display systems, *Air traffic control systems, Alphanumeric data, Human factors engineering, Automation (U)
IDENTIFIERS: ARTS 3(Automated Radar Terminal System 3), Automated radar terminal system 3 (U)

A method of presenting flight data on the automated radar terminal system (ARTS III) plan view display (PVD), for use in high-density terminal facilities, was evaluated. Consideration was given to the alphanumeric writing demands, the controllers' ability to read alphanumerics from various positions around the PVD, and the operational air traffic control (ATC) aspects of the concept. The method tested did not excessively burden the alphanumeric writing capability of the ARTS III. The controllers were able to read the alphanumerics satisfactorily. While the overall method of presenting data was found to be unsatisfactory, due to excessive keyboard workload and the limited number of flights on which data could be displayed simultaneously, some of the techniques employed should be retained for use in the program that succeeds Concept I. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A022 105 17/7 1/5
COMPUTER SCIENCES CORP FALLS CHURCH VA

Airport Surface Traffic Control Concept Formulation Study. Volume IV. Estimation of Requirements. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Feb 75, JUL 75 239P D'Alessandro,F. ;Heiser,W. ;Knights,G. ;Monteleon,P. ;Reffelt,R. ;
REPT. NO. DOT-TSC-FAA-75-8-V4
CONTRACT: DOT-TSC-678
MONITOR: FAA-RD,TSC 75-120-4,FAA-75-8-Vol-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A022 104.
DESCRIPTORS: *Air traffic control systems, *Command and control systems, *Airport control towers, Management planning and control, Systems engineering, Airports, Illinois, Runways, Taxiways, Taxiing, Terminal flight facilities, Surveillance, Requirements (U)
IDENTIFIERS: ASTC(Airport Surface Traffic Control), Airport surface traffic control, O'Hare International Airport (U)

A detailed study of requirements was performed and is presented. This requirements effort provided an estimate of the performance requirements of a surveillance sensor that would be required in a TAGS (Tower Automated Ground Surveillance) system for use in both good and poor visibility conditions. Detailed studies were made of the complex type of conflicts to be solved by both the Ground and Local Controllers and operational levels and densities were developed. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A022 104 17/7 1/5
COMPUTER SCIENCES CORP FALLS CHURCH VA

Airport Surface Traffic Control Concept Formulation Study. Volume III. Operations Analysis of O'Hare Airport-Part II. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Feb 75, JUL 75 280P D'Alessandro,F. ;Heiser,W. ;Knights,G. ;Monteleon,P. ;Reffelt,R. ;
CONTRACT: DOT-TSC-678
MONITOR: FAA-RD,TSC 75-120-3,FAA-75-8-Vol-3-Pt-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A022 103 and Volume 4, AD-A022 105.
DESCRIPTORS: *Air traffic control systems, *Command and control systems, *Airport control towers, Management planning and control, Systems engineering, Airports, Illinois, Runways, Taxiways, Taxiing, Terminal flight facilities, Effectiveness, Work (U)
IDENTIFIERS: ASTC(Airport Surface Traffic Control), Airport surface traffic control, O'Hare International Airport (U)

The volume presents the results of the quantitative analyses of the O'Hare ASTC System operations. The operations environments for the periods selected for detailed analysis of the ASDE films and controller communications recording are described. Following this, results of the data analyses are presented for the areas of: (1) Aircraft flow analysis, including traffic flow statistics for the ramp, ground taxi, and local control areas; (2) Controller workload analysis, both communications and non-communications; and, (3) Cockpit crew workload analysis, both communications and non-communications. The volume also presents the results of the operations effectiveness analysis for the current O'Hare ASTC system and for the projected future operating environment at O'Hare. The results for the current system include both quantitative and qualitative analysis of the operations observed using the data derived from the functional activity analysis of system operation. (U)

AD-A022 103 17/7 1/5
COMPUTER SCIENCES CORP FALLS CHURCH VA

Airport Surface Traffic Control Concept Formulation Study. Volume II. Operations Analysis of O'Hare Airport-Part I. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Feb 75, JUL 75 219P D'Alessandro,F. ;Heiser,W. ;Knights,G. ;Monteleon,P. ;Reffelt,R. ;
CONTRACT: DOT-TSC-678
MONITOR: FAA-RD,TSC 75-120-3,FAA-75-8-Vol-2-Pt-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-A022 104 and Volume 1, AD-A022 026.
DESCRIPTORS: *Air traffic control systems, *Command and control systems, *Airport control towers, Management planning and control, Systems engineering, Airports, Illinois, Runways, Taxiways, Taxiing, Terminal flight facilities, Configurations, Surveillance (U)
IDENTIFIERS: ASTC(Airport Surface Traffic Control), Airport surface traffic control, O'Hare International Airport (U)

The report describes the approach followed and the analysis techniques employed in the performance of the operations analysis of the current ASTC system for the baseline airport, O'Hare International Airport, Chicago, Illinois. It also describes the data resulting from this analysis to draw conclusions on the effectiveness of the current ASTC system operations at O'Hare and on the effectiveness of the system in projected future operational environments at O'Hare. (U)

AD-A022 076 17/7 17/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Results of Simulation Experiments Designed to Show the Effect of Tone Burst Disturbance upon Air Traffic Control Air/Ground Communications. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Apr 75, FEB 76 42P Mulholland,Robert G. ;
REPT. NO. FAA-NA-75-44
MONITOR: FAA-RD 75-187

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Voice communications, Interference, Burst transmission, Air to surface, Transmitters, Disturbances, Air traffic control terminal areas, Time, Channels, Regulations, Simulation (U)

Results of simulation of sectors in the New York Air Route Traffic Control Center (ARTCC), New York Common IFR (instrument flight rules) Room, and terminals within the New York control area are described. The simulation experiments were designed to show the effect of a proposed Federal Communication Commission (FCC) regulation concerning tone burst identification of privately owned transmitters on air traffic control (ATC) air/ground voice communicatons. The results are presented in 180 pages of output data showing the effect of tone burst duration on communications delay and channel utilization over both long (2-hour) and short (1-minute) term time durations for nine distinct sector types. The unmistakable conclusion is that implementation of the proposed regulation will adversely affect air/ground communications unless some way is found to prevent tone burst identification procedures from extending the duration of pilot-initiated transmissions. For example, observed percentage increases in average channel utilization, i.e., the fraction of a 2-hour period during which the air/ground channel is busy, ranged from 11 to 18 percent when the tone burst length was set at 0.5 second. At tone burst durations of 1.5 seconds, the observed range was 35 to 54 percent. (U)

AD-A022 026 17/5 1/5
COMPUTER SCIENCES CORP FALLS CHURCH VA

Airport Surface Traffic Control Concept Formulations Study. Volume 1. Executive Summary. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Feb 75, JUL 75 79P D'Alessandro,F. ;Heiser,W. ;Knights,G. ;Monteleon,P. ;Reffelt,R. ;
CONTRACT: DOT-TSC-678
MONITOR: FAA-RD,TSC 75-120.1,FAA-75-8.1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Command and control systems, *Airport control towers, Management planning and control, Visibility, Air traffic controllers, Illinois, Airports, Visual surveillance, Runways, Taxiways, Taxiing, Terminal flight facilities, Pilots, Ground controlled approach radar, Aviation accidents (U)
IDENTIFIERS: *ASTC(Airport Surface Traffic Control), *Airport surface traffic control, Chicago-O'Hare airport (U)

This four-volume report presents system concepts for use in semi-automated airport surface traffic control at all positions in the tower cab of the major airports. The control functions and data requirements of a Ramp Control System, a ground Control System, and a Local Control System are presented. The concept development process has been based upon an extensive study of cab operations at O'Hare Airport. This effort has included extensive delay analysis, study of communication tapes, and personal observations of the widely-varying situations that are faced by tower controllers. Following the Operations Analysis effort, a detailed study of requirements was performed and is presented in Volume IV of this report. This requirements effort provided an estimate of the performance requirements of a surveillance sensor that would be required in a TAGS (Tower Automated Ground Surveillance) system for use in both good and poor visibility conditions.

(U)

AD-A021 837 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Engineering and Development Program Plan: Flight Service System. (U)

FEB 76 66P
REPT. NO. FAA-ARD-440-2
MONITOR: FAA-ED 13-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Systems engineering, Data acquisition, Data transmission systems, Data management, Geographical distribution, Automation, Forecasting (U)
IDENTIFIERS: DOT/4IZ/ID, DOT/2A, *Flight service stations (U)

The Flight Service System Engineering and Development Program Plan describes the program required to design, develop, and implement a modernized and automated Flight Service System capable of satisfying the forecast 1990 demand for services Program objective, approach, development activities, expected results, and resource requirements are set forth. The modernized Flight Service System supports the basic concept of fewer facilities and self-briefing described in the OST/FAA study, 'A Proposal for the Future of Flight Service Stations'. (U)

AD-A021 835 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Stagger/Destagger Modification for the Air Traffic Control Radar Beacon System. (U)

DESCRIPTIVE NOTE: Final rept. Nov 74-Jun 75,
JAN 76 60P Todd,Paul ;Talotta,Nicholas ;
REPT. NO. FAA-NA-75-59
PROJ: FAA-031-241-020
MONITOR: FAA/RD 75-193

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Modification, False targets, Elimination, Performance(Engineering) (U)
IDENTIFIERS. DOT/4IZ/IZ, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The air traffic control radar beacon system (ATCRBS) was modified so as to eliminate false or second-time-around aircraft replies. A dual-channel stand-alone modification equipment unit was developed to stagger the beacon interrogations and destagger the reply video. The unit can be used with any beacon interrogator defruiter or processor. Two models, an analog and a digital, were developed. The resulting equipments were implemented and tested at the Bedford, Virginia, long-range radar facility. During the engineering tests and operational evaluation, the stagger modification performed reliably. It is recommended that the digital version be implemented at the field facilities. (U)

AD-A021 753 17/7 17/9
FACILITY CHECKING SQUADRON (1867TH) (AFCS) APO SAN FRANCISCO 96274

Special Evaluation AN/TPX 42 (V) Type 3 Yokota AB, Japan. (U)

DESCRIPTIVE NOTE: Final rept. 15 May-10 Jun 75,
JAN 76 30P Renairi,Richard C. ;
REPT. NO. 75/67S-16

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Plan position indicators, Radar landing control, Approach, Mission profiles, Radar targets, Reflection, Acceptance tests, performance, Japan (U)
IDENTIFIERS: *AN/TPX-42 (U)

This report contains the results of the special evaluation performed on the AN/TPX-42 Air Traffic Control Radar Beacon System (ATCRBS) at Yokota AB, Japan. The evaluation took place between 15 May 75 and 10 June 75. The report documents a study on reducing ATCRBS reflections by varying the equipment configuration. Proposals for insuring optimum ATCRBS system configuration and for reducing ATCRBS reflections are presented. (Author) (U)

AD-A021 742 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report, Communications Station Evaluation Report, Cannon AFB, New Mexico. (U)

DESCRIPTIVE NOTE: Final rept. 23 Oct-3 Nov 75,
75 92P Wallachy,Bruce E. ;
REPT. NO. 75/66C-57

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Radio equipment, Airports, Air Force facilities, New Mexico, Performance(Engineering) (U)
IDENTIFIERS: Cannon Air Force Base (U)

The purpose of the evaluation was to define the capabilities and limitations of the air traffic control VHF/UHF communication system. Included in the report are results and analysis of equipment checks, loop test line level diagrams for the RAPCON and control tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a discussion of the Rivet Switch output levels, receiver squelch circuit adjustments, Rivet Switch transmitter modulation metering circuits, RAPCON background noise interference, time domain reflectometer (TDR) measurements, and low angle radio frequency attenuation. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications system at Cannon AFB until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented in this report are valid for other locations using the same communications equipment. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A021 639 17/7 17/9
FACILITY CHECKING SQUADRON (1867TH) (AFCS) APO SAN FRANCISCO 96274

TRACALS Evaluation Report. Special Evaluation AN/FPN-47, Yokota AB, Japan. (U)

DESCRIPTIVE NOTE: Final rept. 15 May-10 Jun 75,
JAN 76 70P Renaini,Richard C. ;
REPT. NO. 75/67S-15

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, Performance(Engineering), Radar antennas, Antenna feeds, Alignment, Search radar, Air traffic control systems, Air Force facilities, Japan (U)
IDENTIFIERS: AN/FPN-47 (U)

The report contains the results of a special evaluation performed on the AN/FPN-47 Airport Surveillance Radar (ASR) at Yokota AB Japan. The evaluation took place between 15 May and 10 June 75. The report documents the effects of the misaligned feedhorn on ASR performance, and makes predicitions on expected performance. (U)

AD-A021 629 5/9 5/1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - Air Traffic Control Specialist Personnel Support. (U)

JAN 76 31P
REPT. NO. FAA-ED-21-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Personnel development, *Civil aviation, *Management planning and control, Methodology, Training devices, Simulators, Human factors engineering, Computer applications, Training, Test methods, Teaching methods (U)
IDENTIFIERS: Projects, DOT/2 A, DOT/4FZ/ FA (U)

This plan defines the objectives, development activities, schedules and resource requirements for the engineering and development activities supporting the overall FAA program to upgrade the selection, training and performance evaluation of air traffic control specialists. (U)

AD-A021 516 17/7 17/9 1/5
FACILITY CHECKING SQUADRON (1867TH) (AFCS) APO SAN FRANCISCO 96274

Special Evaluation AN/TPX-42, Clark AB, RP, Evaluation Dates 14-18 August 1975, 13-26 September 1975. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept. (Final), JAN 76 40P Renairi,Richard C. ;
REPT. NO. 75/67S-17

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar beacons, *Air traffic control systems, Interrogator transmitters, Radar transmitters, Radar receivers, Landing fields, Philippines (U)
IDENTIFIERS: AN/TPX-42, TRACALS(Traffic Control and Landing Systems), Traffic control and landing systems (U)

This traffic control and landing systems (TRACALS) special evaluation report presents data collected to define the capabilities and limitations of the AN/TPX-42A(V) Type 3 Air Traffic Control Radar Beacon System (ATCRBS) at Clark Air Base, Republic of the Philippines. The AN/TPX-42A is part of the radar approach control (RAPCON) facility and was installed in December 1974 to replace the AN/GPX-9B ATCRBS. This report supplements and updates the Clark AB Radar Station Evaluation Report 73/67R-3(012) and where data is unchanged refers to that report. The evaluation was started on 14 August 75, but, due to equipment problems from 19 August to 12 September, was not completed until 26 September 75. The evaluation assessed: Interrogator output power and receiver gain, gain time control (GTC), false targets, and overall system and subsystems operation. The data presented in this report can be used as a guide for anticipated performance until there is a change of equipment or a change occurs in the screening profile. (Author) (U)

AD-A020 811 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Sheppard AFB, Texas, (U)

JAN 76 107P Cranston,Robert L. ;
REPT. NO. 75/66R/52

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Airport radar systems, Performance(Engineering), Radar beacons, Air Force facilities, Radar landing control, Texas (U)
IDENTIFIERS: AN/FPN-47, AN/FPN-16, AN/TPX-42, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, Evaluation, Sheppard Air Force Bas (U)

The report presents data collected to define the capabilities and limitations of the Radar Approach Control Facility located at Sheppard AFB, Tx. The facility is comprised of an AN/FPN-47 radar set, AN/FPN-16 radar set, AN/TPX-42 Air Traffic Control Radar Beacon System (ATCRBS), and associated power systems. Included in the report are descriptions of the lower, upper, inner and outer fringes of the useable radar coverage; Line-of-Sight Diagrams; ATCRBS coverage and tracking capabilities analysis of flight and performance data; and performance predictions for these systems. The ATCRBS data analysis emphasizes the severe false target problem noted at this location. The data presented in this report can be used as a guide for anticipated performance until there is an addition, deletion or relocation of equipment which would change the facility's capability or until a change occurs in the screening profile. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A020 682 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF MANAGEMENT SYSTEMS

FAA Air Traffic Activity, Fiscal Year 1975, (U)

JUN 75 265P Thompson,George E. ;Wilson, Patricia ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 75, AD-A017 055.
DESCRIPTORS: *Air traffic, *Civil aviation, Statistical data, Instrument flight, Instrument landings, Air traffic control terminal areas, Transport aircraft, Information systems, Operation, Military aircraft, Trends, Patterns (U)
IDENTIFIERS: Instrument flight rules, National airspace system, Services, DOT/2 A, DOT/5 L, Air taxis (U)

This report furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated airport traffic control towers (ATCTs), air route traffic control centers (ARTCCs), flight service stations (FSSs), combined station towers (CS/Ts), international flight service stations (IFSSs), and approach control facilities. (U)

AD-A020 679 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Stress in Air Traffic Controllers: Comparison of Two Air Route Traffic Control Centers on Different Shift Rotation Patterns. (U)

DESCRIPTIVE NOTE: Final rept., SEP 75 14P Melton,C. E. ;Smith,R. C. ;McKenzie,J. M. ;Saldivar,J. T. ; Hoffmann,S. M ;
REPT. NO. FAA-AM-75-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Stress(Psychology), *Stress(Physiology), *Air traffic controllers, Sleep, Cycles, Work, Personnel, Rotation, Response(Biology), Urine, Fatigue(Physiology) (U)

Stress in 23 air traffic controllers (ATCS) at Atlanta Air Route Traffic Control Center (ATL) on the straight 5-day shift rotation schedule was compared with stress in 23 ATCS's on the 2-2-1 shift rotation schedule at Fort Worth Air Route Traffic Control Center (FTW). Stress in six other FTW ATCS's on the 5-day schedule was compared to stress in their 23 cohorts on the 2-2-1 schedule. Stress estimates were made from urinary levels of 17-ketogenic steroids (st), epinephrine (e), and norepinephrine (ne). (U)

AD-A020 668 17/2 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report, Kelly AFB, Texas. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept., DEC 75 96P Wallachy,Bruce E. ;
REPT. NO. 75/66C-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication equipment, *Air traffic control systems, Limitations, Antennas, Towers, Very high frequency, Ultrahigh frequency, Performance, Propagation, Line of sight, Modulation, Surface to air, Air to surface, Missions (U)

A Traffic Control and Landing Systems (TRACALS) Communication Station Evaluation was performed at Kelly AFB, TX (1923 CG) 20 through 30 Jun 75. The purpose of the evaluation was to define the capabilities and limitations of the Air Traffice Control VHF/UHF communications systems. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the GCA and Control Tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, a comparison of coverage between 50 watts and 10 watts of transmitter power was made. A method which can be used to quickly and easily determine the calibration of the Rivet Switch transmitter percent of modulation metering circuits is also included. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications systems at Kelly until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. The principles presented in this report are valid for other locations using the same communications equipment. (Author) (U)

AD-A020 462 17/7 1/5 17/9
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

The Netherlands Proposes the 'Largo'. (U)

JAN 76 6P
REPT. NO. FTD-ID(RS)I-2496-75

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Aviation International (France) n670 p57 1975, by Carol S. Nack.
DESCRIPTORS: *Air traffic control systems, *Radar, Civil aviation, Netherlands, Air traffic control terminal areas, Airport radar systems, Radar equipment, Translations, Computer applications (U)
IDENTIFIERS: Largo air traffic control system (U)

The Netherlands proposes a new system of controlling civil air traffic, known temporarily as 'Largo'. According to the terms used during a press conference, the 'Largo' is a modular mini-system which relies in particular on a computer with duplicate programs to avoid conflicts of traffic when proposing the most adequate solutions to the controller, when computing the ideal time for each take-off, during the exchange of radar information with other centers, etc. The system is based on using LAR-II radar which usefully sweeps the air space between 1000 m and 370 km up to an altitude of 120,000 feet and which has an antenna rotation rate which can be set betweeb 6 and 12 rpm. Considering its fundamental characteristics, the same radar thus makes it possible to control distant zones at the same time as it controls the terminal of an airport.(U)

AD-A020 351 17/7
MITRE CORP MCLEAN VA

Automated IFR Traffic Control: Project Overview and Objectives, (U)

NOV 75 77P Rucker,R. A. ;
REPT. NO. MTR-7073
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 75-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Man machine systems, Automation, Performance(Human), Computerized simulation, Digital computers, Models, Arrival, Altitude, Clearances, Technology, Economic analysis, Operation, Data bases, Modification, Instrument flight (U)
IDENTIFIERS: Routine operations, Third generation systems, DOT/2 A, DOT/4IZ/ID, Instrument flight rules (U)

A digital computer simulation of the automated control of IFR traffic through a realistic replica of an en route arrival sector is described, along with the current plans for improving that model. The simulation is currently capable of automatically planning conflict-free clearances using altitude restrictions and assignments, updating that plan based on flight progress, and issuing the planned clearances at the proper time to assure that minimum separation standards are not violated. The objective is to experimentally develop the technical means for, and the operational and economic implications of, automating the more routine IFR traffic control tasks while assuring that the human controller can retain full cognizance and managerial control of the situation. (U)

AD-A020 160 9/2 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Reliability Analysis of the 9020A and 9020D Central Computer Complex at the National Aviation Facilities Experimental Center. (U)

DESCRIPTIVE NOTE: Final rept. Jun 66-Sep 72,
NOV 75 70P Moss,Arthur R. ;
REPT. NO. FAA-NA-75-37
MONITOR: FAA-RD 75-175

UNCLASSIFIED REPORT

DESCRIPTORS: *Digital computers, *Air traffic control systems, Reliability(Electronics), Printed circuits, Time, Input output processing, Maintainability, Data processing equipment, Modules(Electronics) (U)
IDENTIFIERS: Mean time between failures, 9020 computer complexes, IBM 360 computers, DOT/4IZ/IA (U)

This report summarizes 4 years of reliability and maintainability assessments on the 9020 Central Computer Complex (CCC) at the National Aviation Facilities Experimental Center (NAFEC). The original version of the CCC (the 9020A system) was monitored for a 3-year consecutive period between June 22, 1966, and June 30, 1969. A later improved version (the 9020D system) was monitored for a 1-year period between October 1, 1971, and September 30, 1972. This report also discusses printed circuit card replacements which occurred in both the 9020A and 9020D systems during the total 4 years of reliability determination. In the case of the 9020D system, additional information on usage, scheduled maintenance information, and part failures is provided. (U)

AD-A019 299 5/5 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Human Factors Experiments for Data Link. (U)

DESCRIPTIVE NOTE: Final rept. Jan 72-Jun 75,
NOV 75 145P Hilborn,Edwin H. ;
REPT. NO. DOT-TSC-FAA-75-19
MONITOR: FAA-RD 75-170

UNCLASSIFIED REPORT

DESCRIPTORS: *Human factors engineering, *Air traffic control systems, *Input output devices, Flight crews, Data displays, Coding, Flight simulators, Cockpits, Data links, Formats, Data transmission systems, Visual aids, Printing, Voice communications, Reaction(Psychology), Performance(Human), Downlink, Laboratory tests (U)
IDENTIFIERS: DOT/4HZ/HD (U)

This report describes the results of a series of experiments to evaluate cockpit Input/Output devices for Data Link as Phase I of a larger project to explore all facets of the digital transmission of air traffic control information. Following preliminary laboratory experiments to investigate optimum means of formatting and presenting information, prototype hardware was fabricated and evaluated on GAT-1 and GAT-2 simulators. Deficiencies in the prototypes were noted, and new improved hardware was fabricated for further evaluation on the GAT-2 and airline simulators (B-727 and DC-9). Data Link as a concept was found to be generally acceptable, and there was widespread agreement that it would reduce crew workload. Airline pilots were concerned by the loss of information resulting from the selective address capabilities of Data Link, so that they did not hear messages intended for other aircraft. Pilots also questioned the acceptability of Data Link for ground and local control. Visual displays were preferred for all but emergency messages; for these, the use of synthetic speech (Vosyn) is a likely candidate.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A019 221 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Airline Delay Trends, 1972 - 1973, Study of Block Time Delays Ground and Airborne for Scheduled Air Carriers. Volume II. Appendix. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 75 477P Horowitz,Seymour M. ;
REPT. NO. FAA-EM-74-11-Vol-2

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: See also Volume 1, AD-A015 870.
DESCRIPTORS: *Commercial aviation, *Delay, *Air traffic control systems, *Scheduling, Time intervals, Arrival, Flight paths, Airports, Routing, Data bases, Statistical data, Data displays, Graphics, Tables(Data) (U)

Estimates of block time delays for the nation's domestic scheduled air carriers operating out of 20 major airports were determined from a data base recently made available by the CAB. This data base provides monthly averages of operational times, both airborne and on the ground, for all route segments receiving scheduled air carrier service, but the data in this report are limited to the 325 route segments connecting with the 20 airports included in this study. Block time delays are those encountered from ramp to ramp on a route segment. Average monthly estimates of the delays for the airborne portion of the segment (wheels off wheels on) are provided for a two year period from 1972 to 1973, and are categorized according to (1) route segment, (2) airline, (3) aircraft type and (4) local scheduled arrival or departure time. Average monthly estimates of the ground portion of the route segment are categorized according to arrival and departure ground times at the 20 specific airport locations connecting the network of routes included in the study. Estimates of arrival and departure ground delays at specific airports are categorized further into Busy and Dull time intervals. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A019 157 17/7 1/5
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

An Overview of Airport Surface Traffic Control - Present and Future. (U)

DESCRIPTIVE NOTE: Final rept. Dec 74-Jul 75,
SEP 75 44P Hagerott,Robert E. ;
REPT. NO. TSC-FAA-75-20
MONITOR: FAA-RD 75-144

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Airports, Ground level, United States, Surveys, Systems engineering, Problem solving, Efficiency, Safety, Cost effectiveness, Management planning and control (U)
IDENTIFIERS: *Airport surface traffic control, DOT/3 H, DOT/4 CZ/CE (U)

The Airport Surface Traffic Control System, an integral part of the nation's Air Traffic Control System, is specifically concerned with the safe and efficient control of airport airside surface traffic. The current status of airport surface traffic control in the United States is summarized, and the most important of the planned system improvements are presented. (U)

AD-A018 964 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report. Grand Forks AFB, North Dakota. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept., NOV 75 120P Smith,David E. ;
REPT. NO. 75/66R/45

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Airport radar systems, Radar stations, Search radar, Radar beacons, Performance, North Dakota, Air Force facilities, Ground controlled approach radar (U)
IDENTIFIERS: Grand Forks Air Force Base, Evaluation, AN/GPN-12, AN/TPX-42, AN/FPN-16, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The Traffic Control and Landing Systems (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the Radar Approach Control (RAPCON) facility located at Grand Forks AFB, ND. The evaluation period was 9-23 July 1975. The Grand Forks facility is comprised of an AN/GPN-12 Airport Surveillance Radar (ASR), AN/TPX-42 Air Traffic Control Radar Beacon System (ATCRBS), AN/FPN-16 Precision Approach Radar (PAR), and associated power systems. Included in this report are descriptions of the lower, upper, inner and outer fringes of useable radar coverage; Lone-of-Sight Diagrams; ATCRBS coverage and tracking capabilities; PAR service assessments; performance predictions; and an analysis of data. The contents of this report should be used as a guide for anticipated system performance until there is an addition, deletion, or relocation of equipment which would change the facility's present configuration. (U)

AD-A018 963 17/7
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Tacan, ILS and TVOR Station Evaluation Report, Ellington AFB, Texas, 27 May-5 June 1975. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept., SEP 75 133P Raeth,Joseph N. ;
REPT. NO. 75/66N/43

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radio navigation, Radio stations, TACAN, Ground controlled approach radar, Instrument landings, Glide slope, Performance, Texas, Air Force facilities (U)
IDENTIFIERS: Ellington Air Force Base, Evaluation, AN/GRN-20B, AN/MRN-7, AN/MRN-8, AN/FRN-31 (U)

The evaluation report presents data collected and analyzed to define the capabilities and limitations of the Ellington AFB TACAN (AN/GRN20B) ILS (AN/MRN-7 and AN/MRN-8), TVOR (AN/FRN-31), and associated power systems. A special test was made to check TACAN coverage with a power level of 200 watts at the antenna. The report documents cable problems on the TACAN and ILS glide slope. Nearly out of tolerance ground check error spread and airborn azimuth error exists on the TVOR primarily due to defective goniometers Airborne and ground evaluation indicated that the facilities were fully capable of providing satisfactory service. (U)

AD-A018 561 17/2 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C

Integrated National Airspace Communication System (INACS) for the Support of Air Traffic Control Operations in the 1980s and 1990s. Operational/Maintenance Requirements. (U)

JUL 75 142P
REPT. NO. FAA-INACS-011-221-OR

UNCLASSIFIED REPORT

DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, Voice communications, Commercial aviation, Data links, Radio links, Microwave landing systems, Integrated systems, Operation, Maintenance, Requirements (U)
IDENTIFIERS: Federal aviation administration, DOT/4HZ/HD, DOT/4IZ/ID (U)

This document is intended to provide the operating/maintenance requirements for future National Airspace System communications system designs and developmental efforts, and the vehicle for discussion and coordination with the various policy planning, operating, maintenance, and engineering activities concerned with FAA Communications. Requirements submitted by Air Traffic and Airway Facilities Services have been used and augmented by inputs from SRDS, MITRE and the Computer Sciences Corporation. Communications requirements are established for all national airspace environments. This document provides the basic sets of requirements applicable to each of the environments and their subsets, i.e., voice/data air/ground communications, voice ground/ground communications and data ground/ground communications. These requirements will be utilized to derive the detailed functional and design requisites to be incorporated in all Integrated National Airspace Communication System (INACS) specifications. (U)

AD-A018 141 17/9
ITT GILFILLAN INC VAN NUYS CALIF

Localized Cable Radar (LOCAR) Feasibility Study. (U)

DESCRIPTIVE NOTE: Final technical rept. 28 Jun 74-23 Jul 75,
SEP 75 69P Waddoup,R. ;
CONTRACT: F30602-74-C-0355
PROJ: AF-6515
TASK: 651504
MONITOR: RADC TR-75-234

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Radar landing control, Air traffic control systems, Visibility, Runways, Surveillance, Radar interference, Radar antennas, Feasibility studies, Electromagnetic compatibility (U)
IDENTIFIERS: Blind spots, Localized cable radar (U)

A breadboard LOCAR (Localized Cable Radar) sensor unit was fabricated by ITT Gilfillan for feasibility testing. A description of the equipment is given and the tests are reported. During testing a variety of aircraft and ground targets were reliably detected in an airport ground traffic environment. Applicability of LOCAR to the airport ground traffic surveillance was established and sensor unit design improvements indicated. (Author) (U)

AD-A017 767 17/9
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Special Evaluation Report. The Effects of Aircraft Velocity on MTI Systems. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.
OCT 75 46P
REPT. NO. 75/68-R-14

UNCLASSIFIED REPORT

DESCRIPTORS: *Moving target indicators, *Airport radar systems, Flight speeds, Aircraft, Velocity, Air traffic controllers, Search radar, Effectiveness, Surveillance (U)
IDENTIFIERS: AN/FPN-47, Blind speeds (U)

This Special Evaluation was designed to provide the air traffic controller and radar maintenance technician with an understanding of the performance capabilities and limitations of various types of radar Moving Target Indicator (MTI) systems and the associated blind speeds. Contained in this report are data identifying and documenting the width and depth of the blind speed notch in the AN/MPN-series and AN/FPN-47 airport surveillance radars. Discussions of test configurations, test methods, analysis of the collected data, conclusions that were derived from the analysis and recommendations to assure the best possible equipment configuration are also contained in this report. (Author) (U)

AD-A017 554 5/10 5/5 6/16
HUMAN FACTORS RESEARCH INC GOLETA CALIF

EEG Theta Regulation and Radar Monitoring Performance in a Controlled Field Experiment. (U)

DESCRIPTIVE NOTE: Technical rept. 1 Oct 72-30 Sep 75, SEP 75 31P O'Hanlon,James F. ;Royal, Jackson W. ;Beatty,Jackson ;
REPT. NO. TR-1738-F
CONTRACT: N00014-70-C-0350

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with California Univ., Los Angeles. Dept. of Psychology.
DESCRIPTORS: *Vigilance, *Radar operators, *Air traffic controllers, *Target detection, *Electroencephalography, Bioelectricity, Feedback, Human factors engineering, Performance(Human), Psychophysiology, Monitoring, Naval personnel, Experimental data (U)
IDENTIFIERS: Biofeedback (U)

Fourteen Naval Petty Officers, rated either as Air Controller or Operations Specialist (radarman), and stationed at the USN Pacific Missile Range, Point Mugu, California, were trained to suppress parietal-occipital theta activity in EEG. Each subject then performed a 3-hour vigilance task on two occasions, once with and once without theta contingent feedback. The task was administered using real radar equipment and imagery. It consisted of observing a display to detect the occasional appearance of a simulated 'missile' contact which rapidly moved from the display periphery to its center. Missile detection latency during the third hour of the task was better with feedback, although the result was only marginally significant. Theta activity was, however, significantly lower in the feedback condition. Two subjects who alone showed the 'vigilance decrement' without feedback performed much better while suppressing theta activity when feedback was administered. (U)

AD-A017 492 17/7 9/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

National Airspace System. Measuring Air Route Traffic Control Center Computer Utilization. (U)

DESCRIPTIVE NOTE: Final rept. Apr 74-Apr 75, APR 75 115P McCrory,Michael J. ;
REPT. NO. FAA-RD-75-171

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Computer applications, *Computer programs, *Air space, *Control centers, Data processing, Data acquisition, Data reduction, Time, Scheduling, Utilization, Statistical data, Measurement (U)
IDENTIFIERS: DOT/4IZ/ID (U)

Many of the proposals for improvement in National Airspace System (NAS) automation programs are dependent upon available computer processing time in the Air Route Traffic Control Center (ARTCC) computer systems. Systems Research and Development Service was tasked to determine the details of ARTCC Computer Utilization. After a discussion of available alternatives, it was decided to collect approximately six months of data from each of the twenty Air Route Traffic Control Centers within the conterminous United States. A computer program, designed and produced at NAFEC, reduces the collected data to meaningful statistics. This report presents the methods used as well as the conclusions derived from the survey. (Author) (U)

AD-A017 438 17/7
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Radar/Communications Station Evaluation Report RAF Bentwaters, England. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept., OCT 75 108P Parker,Roy A. ;
REPT. NO. 75/68R-16

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Ground controlled approach radar, Communication and radio systems, Airport radar systems, Search radar, Radar beacons, Performance(Engineering), Great Britain, Military facilities (U)
IDENTIFIERS: AN/MPN-14J, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The radar traffic control and landing systems (TRACALS) station evaluation report presents data collected to define the capabilities and limitations of the AN/MPN-14J Mobile Radar Approach Control (MRAPCON) facility and air traffic control communications at RAF Bentwaters, England. The report includes descriptions of the airport surveillance radar (ASR) upper, lower, outer and inner fringes of usable radar coverage, coverage diagrams, and analysis of equipment performance data; air traffic control radar beacon system (ATCRBS) coverage, tracking capabilities and analysis of equipment performance data; precision approach radar (PAR) coverage, tracking capabilities and analysis of equipment performance data; and analysis of the performance data of the air traffic control ground-air-ground communications equipment utilized by the control tower and MRAPCON. The data presented in this report can be used as a guide for anticipated system performance until there is an addition, deletion or relocation of equipment, or until a change occurs in the horizontal profile. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A017 369 17/7 17/2 5/8
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

The Controller/Computer Interface with an Air-Ground Data Link. Volume II. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 75 250P Rossiter,S. ;Wiseman,R. ; Connelly,M. ;Morgan,T. ;
REPT. NO. FAA-NA-74-21-II
PROJ: FAA-062-222-040
MONITOR: FAA-RD 75-133-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Sep 75, AD-A017 086.
DESCRIPTORS: *Air traffic control systems, *Data links, *Human factors engineering, Air traffic controllers, Man machine systems, Interfaces, Automation, Simulation, Display systems, Voice communications, Message processing, Air traffic control terminal areas, Computers (U)
IDENTIFIERS: DOT/4IZ/ID (U)

A dynamic simulation study was conducted to determine the display techniques and operating procedures that best enable an air traffic controller to work in a mixed voice/digital communications environment. The study focused on the benefits that might accrue to ground-based automatic control through further automation of the controller's communication tasks. A simplified version of the ARTS III Metering and Spacing system was used to assess the controller's communication task when automatically generated control commands were transmitted to voice link or to data link-equipped aircraft in terminal approach traffic. Subject to follow-on testing of a more operational nature, it was concluded that a data link channel efficiently augments the voice channel, the value increasing as the percentage of data link aircraft increases. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A017 090 17/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Aircraft L-Band Balloon - Simulated Satellite Experiments Volume I. Experiment Description and Voice and Data Modem Test Results. (U)

DESCRIPTIVE NOTE: Final rept. Sep 71-Nov 73,
OCT 75 139P Engels,Peter D. ;Wilson, Robert A. ;
REPT. NO. TSC-FAA-74-24
MONITOR: FAA-RD 75-174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A005 649.
DESCRIPTORS: *Satellite communications, *Air traffic control systems, Continuous waves, Multipath transmission, Air to space, L band, Balloons, Modems, Transponders, Delta modulation, Pulse duration modulation, Voice communications, Frequency modulation (U)
IDENTIFIERS: DOT/4HZ/HD, DOT/4IZ/ID (U)

This report details the result of an experiment performed by the Transportation Systems Center of the Department of Transportation to evaluate candidate voice and data modulation systems for use in an L-Band Air Traffic Control System. The experiment was designed to evaluate performance in the presence of oceanic multipath, using a high altitude balloon carrying an L-Band transponder as a geostationary satellite simulator. The voice modems chosen were Delta Modulation, Pulse Duration Modulation and Adaptive Narrow-Band Frequency Modulation. The data modems used employed PSK modulation with coherent demodulation. This is Volume I of a two-volume report. Volume II 'CW Multipath Test Results and Analyses, 'FAA-RD-73-173, details the portion of the data dealing exclusively with the measurement of oceanic multipath. (Author) (U)

AD-A017 086C 17/7 17/2 9/2 5/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

The Controller/Computer Interface with an Air-Ground Data Link. Volume I. (U)

DESCRIPTIVE NOTE: Final rept. May-Aug 74,
SEP 75 13P Rossiter,S. ;Connelly,M. ;
Wiseman,R. ;Morgan,T. ;
REPT. NO. FAA-NA-74-21-I
MONITOR: FAA-RD 75-133-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Computers, *Air traffic controllers, *Data links, Man machine systems, Interfaces, Display systems, Simulation, Voice communications, Message processing, Air traffic control terminal areas (U)
IDENTIFIERS: DOT/4IZ/ID (U)

A dynamic simulation study was conducted to determine the display techniques and operating procedures that best enable an air traffic controller to work in a mixed voice/digital communications environment. The study focused on the benefits that might accrue to ground-based automatic control through further automation of the controller's communication tasks. The simulation was performed at the National Aviation Facilities Experimental Center as a joint effort with the Department of Transportation, Transportation Systems Center. A simplified version of the ARTS III Metering and Spacing system was used to assess the controller's communication task when automatically generated control commands were transmitted to voice link or to data link-equipped aircraft in terminal approach traffic. Subjectto follow-on testing of a more operational nature, it was concluded that a data link channel efficiently augments the voice channel, the value increasing as the percentage of data link aircraft increases. (U)

AD-A017 055 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C INFORMATION AND STATISTICS DIV

FAA Air Traffic Activity, Calendar Year 1974 and Terminal Area Relationships, Fiscal Year 1974. (U)

MAR 75 427P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 1971, AD-737 140.
DESCRIPTORS: *Air traffic, *Civil aviation, Statistical data, Surveys, Operation, Aircraft, Instrument landings, Air traffic control terminal areas, Classification, Municipalities, Information systems (U)
IDENTIFIERS: DOT/2A, DOT/5L, Services (U)

This FAA publication furnishes terminal and enroute air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service Stations (FSSs), and Approach Control Facilities. Data for 12-month periods are combined for fiscal and calendar year reports. These reports are used as a guide in determining the need for larger or additional facilities, and possible increases in personnel at existing facilities. (U)

AD-A016 994 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report, Dobbins AFB, Georgia. (U)

DESCRIPTIVE NOTE: Station Evaluation,
SEP 75 80P Wallachy,Bruce E. ;
REPT. NO. 75/66C/40

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Radio transmission, Communication equipment, Radio signals, Intensity, Performance(Engineering), Georgia, Air Force facilities (U)
IDENTIFIERS: Evaluation, Dobbins Air Force Base (U)

A Traffic Control and Landing Systems (TRACALS) Communication Station Evaluation was performed at Dobbins AFB, Ga (2157 Comm Sq) 17 through 29 March 1975. The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control VHF/UHF communications system. Included in this report are results and analysis of equipment checks, loop test line level diagrams for the GCA and Control Tower systems, line of sight coverage data, analysis of airborne measurements, and plots of UHF radiation patterns. In addition, there is included a method which can be used to quickly and easily determine the calibration of the Rivet Switch transmitter percent of modulation metering circuits. The data and diagrams presented in this report can be used as a guide for anticipated performance of the communications system at Dobbins until there is an addition, deletion, relocation of equipment, or change in horizon profile which could affect the ststem. The principles presented in this report are valid for other locations using the same communications equipment. (U)

AD-A016 768 17/7 17/9
AIR FORCE COMMUNICATIONS SERVICE RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Precision Approach Radar Station Evaluation Report, Fairchild AFB, WA, (U)

SEP 75 46P Cranston,Robert L. ;
REPT. NO. 75/66R-46

UNCLASSIFIED REPORT

DESCRIPTORS: *Ground controlled approach radar, Air traffic control systems, Radar stations, Air Force facilities, Performance(Engineering), Washington(State) (U)
IDENTIFIERS: Fairchild Air Force Base (U)

A Precision Approach Radar (PAR) station evaluation was conducted at Fairchild AFB, WA (2039 CS) from 1 Aug to 8 Aug 75. This report presents the results of equipment checks, clutter analysis, runway survey, and the flight evaluation. Emphasized in this report is the excessive Angle Voltage Generator (AVG) 24-hour drift which has been observed at 10 of the 11 stateside facilities. In addition, the MTI speed related target deterioration which accurred between 164 and 179 knots is discussed. (U)

AD-A016 666 17/9 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMEN. SERVICE

Radar Enhancement of Small Aircraft in the Air Traffic Control (ATC) System. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 75 425P Turnbull,Donald H. ;
REPT. NO. FAA-RD-75-98

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar, Aircraft, Air traffic control systems, Radar cross sections, Performance(Engineering), Active systems, Passive systems, Radar reflections, Transponders (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DOT/4IZ/IE (U)

An investigation was undertaken to develop and determine the practicality of small aircraft radar enhancement devices. This report discusses the detection capability of present radars as well as an analysis and evaluation of passive radar enhancement devices and active radar enhancement devices. The report concludes that passive enhancement devices are not practical and that active enhancement devices are too costly when compared to the existing Air Traffic Control Radar Beacon System (ATCRBS) transponders. (U)

AD-A016 622 17/7 5/9
STANFORD RESEARCH INST MENLO PARK CALIF

Capacity and Productivity Implications of Enroute Air Traffic Control Automation. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 74 149P Couluris,G. J. ;Ratner,R. S. ;Petracek,S. J. ;Wong,P. J. ;Ketchel, J. M. ;
CONTRACT: DOT-FA70WA-2142
PROJ: SRI-8181
MONITOR: FAA-RD 74-196

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Air traffic controllers, Automation, Display systems, Air traffic, Data processing, Voice communications, Planning, Models, Capacity(Quantity), Work measurement, Networks (U)
IDENTIFIERS: Workload, DOT/4IZ/ID (U)

This report documents the work performed by Stanford Research Institute (SRI) to evaluate controller productivity and capacity benefits potentially realizable from postulated evolution of enroute air traffic control (ATC) automation. This work focused on the workload limitations of human controllers and the effects on controllers of various automation applications to National Airspace System (NAS) Stage A3d.2 ATC. Empirical measurements of routine, surveillance, and conflict processing activities were used to develop workload models of control-team operations. These models are extensions of the Relative Capacity Estimating Process (RECEP) previously developed by SRI. They were used to assess the potential benefits of enhancements including an electronic tabular flight data display. The workload models were incorporated into the SRI Air Traffic Flow (ATF) network simulation model to assess the potential benefits of a computerized facility-level traffic flow control method termed planning control. (Author) (U)

AD-A016 356 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS (Discrete Address Beacon System) Downlink Coding. (U)

DESCRIPTIVE NOTE: Project rept.,
SEP 75 38P Barrows,J. T. ;
REPT. NO. ATC-48
CONTRACT: F19628-76-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-021
MONITOR: FAA-RD 75-61

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Data links, Coding, Errors, Error correction codes (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

The report summarizes the encoding/decoding techniques incorporated into the DABS downlink design. It has been determined that the binary cyclic code used for the uplink is applicable to the downlink interference environment, thus rendering considerable hardware simplication in the transponder. The downlink environment leads to a characterization as a burst erasure channel, which allows the code to be used in a burst correction capacity. The report concentrates on the error correction techniques including specific implementations. Evaluation of the performance of the code by simulation and/or bench test is presently being carried out and will be reported in a future document. (U)

AD-A015 870 1/2 1/5 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Airline Delay Trends, 1972 - 1973 Study of Block Time Delays Ground and Airborne for Scheduled Air Carriers. Volume I. Summary. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 75 136P Horowitz,Seymour M. ;
REPT. NO. FAA-EM-74-11-Vol-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Commercial aviation, *Delay, *Air traffic control systems, *Scheduling, Time, Arrival, Flight paths, Airports, Data bases, Statistical data (U)
IDENTIFIERS: DOT/4IZ/Id (U)

Estimates of block time delays for the nation's domestic scheduled air carriers operating out of 20 major airports were determined from a data base recently made available by the CAB. This data base provides monthly averages of operational times, both airborne and on the ground, for all route segments receiving scheduled air carrier service, but the data in this report are limited to 325 route segments connecting with the 20 airports included in this study. Block time delays are those encountered from ramp to ramp on a route segment. Average monthly estimates of the delays for the airborne portion of the segment (wheels off to wheels on) are provided for a two year period from 1972 to 1973, and are categorized according to (1) route segment, (2) airline (3) aircraft type and (4) local scheduled arrival or departure time. Average monthly estimates of the ground portion of the route segment are categorized according to arrival and departure ground times at the 20 specific airport locations connecting the network of routes included in the study. Estimates of arrival and departure ground delays at specific airports are categorized further into Busy and Dull time intervals. (Author) (U)

AD-A015 824 17/7 17/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C

Integrated National Airspace Communication System (INACS) for the Support of Air Traffic Control Operations in the 1980s and 1990s. System Concept. (U)

SEP 75 32P
REPT. NO. FAA-INACS-061-221-SC

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Phase 1, AD-A015 823.
DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, Systems engineering, Integrated systems (U)
IDENTIFIERS: INACS(Integrated National Airspace Communication System), Integrated national airspace communication system, DOT/4HZ/HD, DOT/4IZ/ID (U)

The document introduces the concept of an integrated communications approach to meet total FAA operational communications requirements projected for the 1980s and beyond. As a concept, this integrated approach differs from the historical method of satisfying FAA's communications needs by the acquisition or development of dedicated facilities and networks which are designed to serve specific categories of users and which perform specific and dedicated communications functions for these users. State-of-the art communications technology appropriately applied to an integrated system offers opportunities for a substantial reduction in projected total FAA communications recurring costs together with a significant improvement in overall communications operational capability, flexibility and reliability. (U)

AD-A015 823 17/7 17/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C

Integrated National Airspace Communication System (INACS) for the Support of Air Traffic Control Operations in the 1980s and 1990s. Program Planning and Formulation. Phase I Program Plan. (U)

OCT 75 32P
REPT. NO. FAA-INACS-061-221-P1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A015 824.
DESCRIPTORS: *Communication and radio systems, *Air traffic control systems, Integrated systems, Planning (U)
IDENTIFIERS: INACS(Integrated National Airspace Communication System), Integrated national airspace communication system, DOT/4HZ/HD, DOT/4IZ/ID (U)

The state-of the-art in communications technology offers opportunities for a substantial reduction in total FAA communications recurring costs together with a significant improvement in overall communications operational flexibility, reliability and service. An integrated national system, which provides both voice and data communications for all FAA operational facilities and the attendant ATC support functions, can save an estimated 100 million dollars per year in the FAA annual communications budget. (U)

AD-A015 172 17/7 9/2
LOGICON INC SAN PEDRO CALIF

Enroute Air Traffic Control Program Software Optimization Study. (U)

DESCRIPTIVE NOTE: Final rept., JUN 75 229P Kandler,W. D. ;Nielsen,W. C. ;Wick,R. C. ;Prince,L. D. ;
REPT. NO. CSS-75007A
CONTRACT: DOT-FA74WA-3457
MONITOR: FAA-RD 75-87

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Management planning and control, *Computer programming, Optimization, Data storage systems, Central processing units, Coding, Mathematical analysis, Utilization, Computer programs, Data processing, Flow charting (U)
IDENTIFIERS: DOT/2A, DOT/3H (U)

This report documents results of a 10-month study aimed at reducing the core storage and CPU utilization required by the NAS Enroute ATC operational software. Results are presented for six major categories: monitor improvements, program architecture improvements, compool improvements, mathematical improvements, code optimization, and micro-code utilization. Areas of significant inefficiency are identified for each category along with recommendations for improved designs and the projected savings that would accrue from their implementation. (U)

AD-A015 139 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Impact of Obstacle Shadows on Monopulse Azimuth Estimate. (U)

DESCRIPTIVE NOTE: Project rept., JUL 75 60P Spiridon,A. ;
REPT. NO. ATC-50
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 75-91

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Beacons, Azimuth, Errors, Shadows, Barriers (U)
IDENTIFIERS: DOT/4IZ/ID, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

Obstacle shadows, within view of a sensor using monopulse azimuth estimate, cause an error in the azimuth estimate. This report discusses the azimuth error as a function of obstacle dimension and position, and the sensor antenna illumination. (U)

AD-A014 915 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Uplink Coding. (U)

DESCRIPTIVE NOTE: Project rept.,
JUL 75 42P Barrows,J. T. ;
REPT. NO. ATC-49
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-021
MONITOR: FAA-RD 75-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Discrete Address Beacon System (DABS).
DESCRIPTORS: *Air traffic control systems, *Data links, Coding, Errors, Beacons (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

The report details the coding techniques incorporated into the DABS uplink design. Justification is given for the error control method selected in terms of the link characteristics and design constraints. Performance results, including extensive evaluation by simulation and bench test, are presented for the selected code. A binary shortened cyclic code having 24 redundant bits was selected. The overhead due to the code redundancy is minimized by a scheme in which the parity check bits are overlayed on the discrete address field in the encoded message. This code is shown to have the capability of protecting a DABS transponder from accepting an erroneous uplink message with an error probability of less than 10 to the 7th power in a severe interference environment. This same code will be used in the DABS downlink in a burst erasure correction mode. Results of the analysis of the downlink will appear in a separate report. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A014 719 5/10
BATTELLE HUMAN AFFAIRS RESEARCH CENTERS SEATTLE WASH

Defining Research Needs to Insure Continued Job Motivation of Air Traffic Controllers in Future Air Traffic Control Systems. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 75 130P Nealey,Stanley M. ;Thornton, George C. , III;Maynard,William S. ;Lindell, Michael K. ;Hodapp,Richard ;
CONTRACT: DOT-FA74WAI-499

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Colorado State Univ., Fort Collins.
DESCRIPTORS: *Air traffic controllers, *Motivation, Requirements, Scientific research, Air traffic control systems, Job analysis, Job satisfaction, Surveys (U)

The study was made necessary by FAA plans to progressively introduce automated equipment into the ATC system over the next ten years. Such equipment is expected to bring about striking changes in the actual work activities of ATCs in controlling aircraft. Experience with the introduction of NAS Stage A and ARTS III equipment has focused concern on the motivational reaction of ATCs to automated equipment. The objective of this study was to forecast the types of motivational problems likely to be experienced in the face of increasing automation and to suggest social science research necessary to the definition and amelioration of these problems. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A014 513 17/7
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
PARIS (FRANCE)

A Survey of Modern Air Traffic Control.
Volume II, (U)

JUL 75 411P Benoit,Andre ;
REPT. NO. AGARD-ograph-209-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A014 512.
NATO furnished.
DESCRIPTORS: *Air traffic control systems, *Meetings, Air traffic control terminal areas, Air traffic controllers, Navigational aids, Flight paths, Navigation satellites, Data processing, Automation, Human factors engineering, Collision avoidance, NATO (U)

Vol. 2 contains (4) Technical Aids to Air Traffic Control (A = Ground Based Navigation Aids; B = Self-Contained Navigation Aids; C = Landing Guidance Systems; D = Surveillance; E = Visualization; F = The Computer and Processing Facilities; G = The Satellite): (5) Operational ATC Systems. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A014 512 17/7
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
PARIS (FRANCE)

A Survey of Modern Air Traffic Control.
Volume I, (U)

JUL 75 361P Benoit,Andre ;
REPT. NO. AGARD-ograph-209-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A014 513.
NATO furnished.
DESCRIPTORS: *Air traffic control systems, *Meetings, Air traffic control terminal areas, Air traffic controllers, Navigational aids, Flight paths, Navigation satellites, Data processing, Automation, Human factors engineering, NATO (U)
IDENTIFIERS: *Enroute air traffic control (U)

Thirty-four papers are collected in two volumes, covering the following main sections: Vol. 1 contains (1) General Organization;'(2) Human Aspects; (3) Automation of Control Procedures (A = Principles and Applications of Automation; B = On-Board and Ground Based Collision Avoidance Systems;'C = Flow Control Techniques; D = Aircraft Trajectory Predictions; E = Centerline Spacing). (U)

AD-A014 040 1/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Plan for Flight Testing Intermittent Positive Control. (U)

JUN 75 109P Andrews,J. W. ;McFarland, A. L. ;Golden,J. F. ;Perie,M. E. ; Koegler,J. C. ;
REPT. NO. ATC-46
CONTRACT: DOT-FA72WAI-261
MONITOR: FAA-RD 74-210

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-773 397. Prepared in cooperation with Mitre Corp., McLean, Va.
DESCRIPTORS: *Air traffic control systems, *Collision avoidance,*Flight testing, Man machine systems, Pilots, Automation, Interfaces, Test facilities, Mission profiles, Display systems, Communication and radio systems, Operation, Intercept trajectories, Data acquisition, Data reduction, Aviation safety, Test methods (U)
IDENTIFIERS: Intermittent positive control, DOT/5A, DOT/3M (U)

Intermittent Positive Control is an automated aircraft collision avoidance system requiring the participation of the aircraft pilots involved. The operational interface between pilots and the IPC system is being evaluated in a series of live flight tests. The Lincoln Laboratory DABS Experimental Facility, augmented to include the IPC function, is the test bed for these evaluation flights. This document described the objectives and methods of the IPC flight testing being conducted by Lincoln Laboratory. (U)

AD-A013 811 17/7
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ ATC (NAFEC). Volume III-Enroute Hardware Configuration. (U)

SEP 74 46P Geoghan,Robert D. , Jr;
REPT. NO. MTR-4221-Vol-3
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-159-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, Series 1 dated Mar 75, AD-A013 810.
DESCRIPTORS: *Air traffic control systems, Interfaces, Engineering, Models, Data processing equipment (U)
IDENTIFIERS: DOT/4IZ/ID, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The document defines the interfaces between the DABS Engineering Models to be installed at or near NAFEC and the enroute System Support Facility (SSF) at NAFEC. The interfaces for handling the one-way surveillance reports and the interface for handling the two-way communication messages are described. The configuration defined here will be used as a test bed during Phase II of the DABS development program. (U)

AD-A013 810C 17/7
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ ATC (NAFEC). Volume II-Series 1-Enroute Data Formats. (U)

MAR 75 32P Geoghan,Robert D. , Jr;
REPT. NO. MTR-4221-Vol-2-Ser-1
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-159-2-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A013 803 and Volume 2, Series 3, AD-A025 233.
DESCRIPTORS: *Air traffic control systems, Interfaces, Formats, Engineering, Models, Beacons (U)
IDENTIFIERS: DOT/4IZ/ID, *Discrete address beacon systems, DABS(Discrete Address Beacon Systems) (U)

The document describes the surveillance and communication message formats for the interface between the Discrete Address Beacon System (DABS) Engineering Models and the NAS Enroute System at NAFEC. This interface will be used for IPC Phase II testing and development testing of the DABS system. There are five volumes to this report, with varying issue dates. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A013 803 17/7
MITRE CORP ATLANTIC CITY N J

Interface Definition DABS Engineering Model/ ATC (NAFEC), (U)

SEP 74 8P Geoghan,Robert D. , Jr;
REPT. NO. MTR-4221-Vol-1
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-159-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Interfaces, Engineering, Models (U)
IDENTIFIERS: DOT/4IZ/ID, DABS(Discrete Address Beacon Systems), *Discrete address beacon systems (U)

The document introduces a series of documents that describe the DABS engineering model/Air Traffic Control (ATC)/Digital Simulation Facility (DSF) interfaces at NAFEC. The ATC systems at NAFEC are the NAS Enroute System Support Facility (SSF) and the Terminal Automation Test Facility (TATF). These systems along with the DSF and the DABS engineering models will become part of a test bed that will be used for development test activities in support of upgrading the Enroute and Terminal Air Traffic Control Systems. (U)

AD-A013 799 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Ground/Air/Ground Communications Special Evaluation Report. 407L Tactical Air Control System. 8 April-1 May 1975. (U)

JUN 75 30P Wallachy,Bruce E. ;
REPT. NO. 75/66S/38

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Performance, Antenna radiation patterns, Air Force facilities, Florida, South Carolina (U)
IDENTIFIERS: Evaluation, An/TRC-87, AN/TSC-62 (U)

The report contains the results of a special evaluation performed on the Ground/Air/Ground communications component of the 407L Tactical Air Control System. The evaluation was conducted on equipment located at Homestead AFB, FL, MacDill AFB, FL, and Shaw AFB, SC from 8 April to 1 May 1975. Included in the report are equipment performance results, radiation pattern measurements, and discussion of equipment operation. System alignment procedures and signal level diagrams are presented for troubleshooting/fault isolation reference and optimum system alignment. (U)

AD-A013 798 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report, Dobbins AFB, Georgia, 16 - 29 Mar 75, (U)

JUN 75 95P Smith,David E. ;
REPT. NO. 75/66R/36

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Air traffic control systems, Radar stations, Search radar, Radar beacons, Georgia, Air Force facilities, Performance (U)
IDENTIFIERS: AN/MPN-13, Evaluation, Dobbins Air Force Base (U)

The Traffic Control and Landing System (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the Ground Control Approach (GCA) facility located at Dobbins AFB, GA. The Dobbins facility is comprised of an AN/MPN-13. Incorporated into this system are an Air Surveillance Radar (ASR), an Air Traffic Control Radar Beacon System (ATCRBS), a Precision Approach Radar (PAR), and associated power systems. Included in this report are performance results and predictions. The contents of this report should be used as a guide for anticipated performance until there is an addition, deletion, or relocation of equipment which could change the facility's present configuration. (U)

AD-A013 732 9/5 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Effects of Local Terrain and Obstacles upon Near Horizon Gain of L-Band Beacon Antennas. (U)

DESCRIPTIVE NOTE: Technical note, JUL 75 93P Spiridon,Alex ;
REPT. NO. TN-1975-6
CONTRACT: DOT-FA72WAI-261, F19628-76-C-0002
PROJ: FAA-034-241-012
MONITOR: ESD TR-75-224

UNCLASSIFIED REPORT

DESCRIPTORS: *Antennas, *Beacons, L band, Gain, Terrain, Shadows, Air traffic control systems, Radio links, Radio transmission, Electromagnetic wave reflections, Diffraction (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID, Air traffic control radar beacon systems (U)

Models are given of the mechanisms that determine the effective gain of an L-band ground based antenna at near horizon elevation angles. Primary emphasis is given to the environment of typical Air Traffic Control Radar Beacon System (ATCRBS) site . (U)

AD-A013 579 17/7 1/5
MITRE CORP MCLEAN VA

Airport Surface Traffic Control Systems Development Analysis - Expanded. (U)

DESCRIPTIVE NOTE: Final rept. Jan 73-Feb 74, MAR 75 115P Bales,R. A. ;Koetsch,J. F. ;
CONTRACT: DOT/TSC-RA-73-11
MONITOR: FAA-RD,TSC 75-51,FAA-74-26

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jan 74, AD-773 699.
DESCRIPTORS: *Airport radar systems, *Cost analysis, *Air traffic control terminal areas, Airports, Benefits, Deployment, Surveillance, Search radar, Plan position indicators, Display systems, Traffic, Runways, Taxiways, Visibility, Weather, Aviation safety, Airport control towers (U)
IDENTIFIERS: *ASTC(Airport Surface Traffic Control), *Airport surface traffic control, Benefit cost analysis, DOT/5L, DOT 4CZ CA (U)

A previous MITRE Technical Report, Airport Surface Traffic Control Systems Deployment Analysis, FAA-RD-74-6, presented an analysis of ASTC (Airport Surface Traffic Control) system requirements and developed estimates of the deployment potential of proposed ASTC system alternatives for 19 air carrier airports. The primary requirement was determined to be improved surveillance which resulted in an estimated deployment of one of two surveillance systems at 16 airports by 1980. This report presents an expansion of that deployment analysis to include a total of 39 air carrier airports. The methods and assumptions for the deployment analysis of the 20 airports presented in this report are essentially the same as in the initial report. The overall result of the analysis is that by the initial deployment date (1976-1980) of the two alternative surveillance systems, the total potential market will be for 20-25 systems. (U)

AD-A013 348 17/7 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Analysis of the Requirement for Air Traffic Control Radar Research and Development, (U)

DEC 74 13P Coonley,Kenneth E. ;
REPT. NO. FAA-RD-74-191

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar, Search radar, Airport radar systems, Research management, Requirements (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The report examines the role of radar in the Upgraded Third Generation ATC System relative to the surveillance requirement for various categories of controlled airspace. It concludes that the retention of ATC radars solely for weather data does not appear desirable in the long term and the possibility exists that development and deployment of radar systems specifically for the detection of weather may be required. Radar surveillance for ATC in the enroute environment may only be required at selected locations by the mid 1980's; therefore research and development efforts on enroute radars should be limited to that required to support the Operating Services in the correction of field problems. Radar surveillance for the terminal environment will be required at most locations on a continuing basis into the foreseeable future; therefore research and development of advanced terminal radar techniques and systems should be continued. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A013 343 5/10
FEDERAL AVIATION ADMINISTRATION OKLAHOMA CITY OKLA CIVIL AEROMEDICAL INST

Attitudes on En Route Air Traffic Control Training and Work: A Comparison of Recruits Initially Trained at the FAA Academy and Recruits Initially Trained at Assigned Centers. (U)

MAY 75 39P Mathews,John J. ;Cobb,Bart B. ;Collins,William E. ;
PROJ: FAA-AM-B-73-PSY-43, FAA-AM-C-74-PSY-43
MONITOR: FAA-AM 75-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-787 238.
DESCRIPTORS: *Air traffic controllers, *Training, *Attitudes(Psychology), Questionnaires, Ratings, Attrition, Retention(General), Job satisfaction, Males, Females, Schools, Recruits (U)
IDENTIFIERS: Dropouts, DOT/4FZ/FA (U)

In this comparison, questionnaires concerning aspects of training-related and work-related attitudes were sent to 225 ATC trainees who represented groups of attritions and retentions in two En Route training programs; viz, programs that provided basic training at the FAA Academy and programs that provided basic training at the trainees' assigned facilities. Data from both groups generally support previous findings regarding sources of differences in work attitudes between sexes and between attrition-retention groups. The most frequent recommendations for change involved facility training and facility instructors; modifications in the pace of training were also recommended frequently. (U)

AD-A012 398 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Network Management. (U)

DESCRIPTIVE NOTE: Project rept.,
MAY 75 103P Vandevenne,H. F. ;
REPT. NO. ATC-45
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 75-8

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Communications networks, Management, Transponders, Decision making, Message processing (U)
IDENTIFIERS: DOT/4IZ/ID, DAB(Discrete Address Beacon Systems), Discrete address beacon systems (U)

This report provides a discussion of the design of the DABS network management function. Network management is responsible for the interaction between the local sensor and the adjacent connected sensors. Based on a dynamic interpretation of the coverage map and the status of the network, network management determines (a) the coverage responsibility of the local sensor, (b) which other sensors are covering the same area, and (c) which of the sensors has principal data link responsibility. Interaction is effected through message exchange over ground communication links connecting the DABS sensors. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A012 107 17/7
MITRE CORP MCLEAN VA

ATC Performance Requirements for Developing Prototype Versions of the Discrete Address Beacon System. (U)

APR 73 76P
REPT. NO. MTR-6321
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Beacons, Performance(Engineering), Data links, Surveillance, Requirements, California (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), *Discrete address beacon systems, DOT/4IZ/ID, Los Angeles Basin (U)

The requirements for the Discrete Address Beacon System (DABS), which is to support the Air Traffic Control System through the 1990's are enumerated. The requirements presented in this paper should be used in developing the prototype versions of DABS. Data link requirements have been developed for several categories of messages. The first category is tactical (numeric), which are essential for air traffic control. Some of these messages are used to support such ATC services as: parallel-approach monitoring, improved metering and spacing, intermittent positive control and enroute monitoring. The second category is called tactical (symbolic), messages that are short alphanumeric messages which are directly related to ATC. Some of these messages are changes in area navigation waypoints, coded routes and holding instructions. The third category is called record messages. These messages are longer symbolic messages which can have a direct ATC connection (e.g., clearances) or messages which are ATC related but not considered essential to an ATC data link (e.g., in flight weather information about the aircraft's destination, etc.). (U)

AD-A011 651 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report, Seymour Johnson AFB, N.C., (U)

APR 75 107P Cranston,Robert L. ;
REPT. NO. 75/66R-34

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar stations, *Airport radar systems, Radar beacons, Search radar, Performance tests, Air Force facilities, North Carolina (U)
IDENTIFIERS: AN/GPN-12, AN/FPN-16, AN/TPX-42, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, Evaluation (U)

The radar Traffic Control and Landing Systems (TRACALS) station evaluation report presents data collected 28 Jan - 11 Feb 1975, to define the capabilities and limitations of the Radar Approach Control Facility located at Seymour Johnson AFB, NC. The facility is comprised of an AN/GPN-12 radar set, AN/FPN-16 radar set, AB/TPX-42 Air Traffic Control Radar Beacon System (ATCRBS), and associated power systems. Included in this report are descriptions of the lower, upper, inner and outer fringes of the useable radar coverage; Line of Sight Diagrams; ATCRBS coverage and tracking capabilities; analysis of flight and performance data; and performance predictions for these systems. The data presented in this report can be used as a guide for anticipated performance until there is an addition, deletion or relocation of equipment which would change the facility's capability or until a change occurs in the screening profile. (U)

AD-A011 485 17/7
NATIONAL BUREAU OF STANDARDS WASHINGTON D C

Validation of Maximum Airport Throughput Levels Estimated by the DELCAP Simulation Model. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 75 73P Gilsinn,Judith F. ;
REPT. NO. NBS-IR-75-638
MONITOR: FAA-RD 75-66

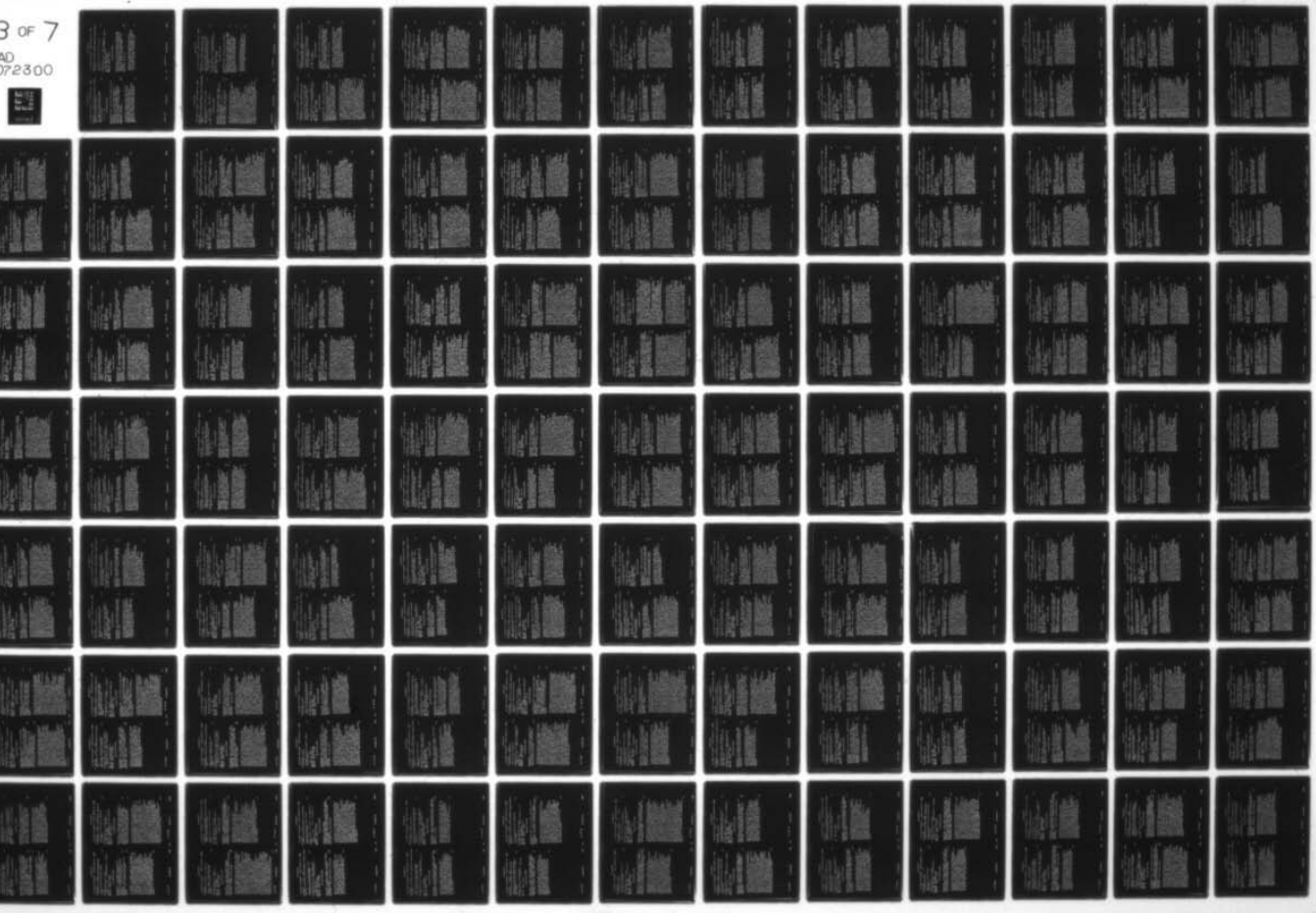
UNCLASSIFIED REPORT

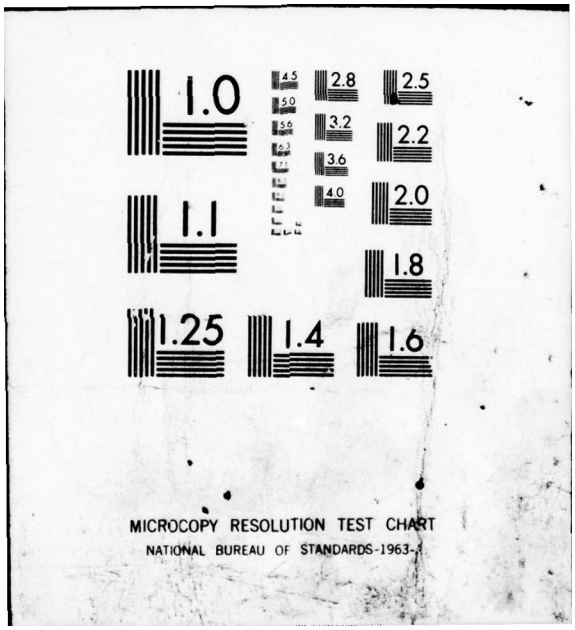
SUPPLEMENTARY NOTE: See also report dated May 71, AD-745 513.
DESCRIPTORS: *Terminal flight facilities, *Air traffic control systems, Air traffic, Runways, Capacity(Quantity), Scheduling, Queueing theory, Computerized simulation (U)
IDENTIFIERS: DOT/4DZ/DA, DOT/4IZ/ID, DELCAP computer program, *Runway capacity, *Airport capacity (U)

This report documents exercises of the DELCAP airport terminal area simulation model performed to validate the maximum throughput calculations of that model. DELCAP was run for five different runway configurations, with three or four appropriate operating policies chosen for each, and for three different mixes of aircraft types. Throughput estimates from DELCAP are found to be in general agreement with current values provided by the FAA. One specific instance of greater discrepancy is identified, and a remedy for it is proposed. Changes made in DELCAP since its original documentation in 1971 are described in an appendix. (U)

AD-A072 300 DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA F/G 1/2
AIR TRAFFIC CONTROL SYSTEMS.(U)
JUL 79
UNCLASSIFIED DDC/BIB-79/04 NL

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AD-A011 088 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

SRDS Technical Program Document, Fiscal Year 1976 Engineering and Development Approved Programs (U)

JUL 75 152P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 74, AD-781 358.
DESCRIPTORS: *Air traffic control systems, *Air transportation, *Civil aviation, Systems engineering, Radar, Radar beacons, Navigation, Communication and radio systems, Landing aids, Aviation safety, Weather, Airports, Research management, Planning (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The technical program document (TPD) contains research and technology resumes which reflect Systems Research and Development Service, Federal Aviation Administration, approved subprograms. These resumes identify the technical objective, approach, milestones scheduled for accomplishment, accomplishments, requirements, etc. (U)

AD-A010 779 17/7 9/1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Color Display Evaluation for Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Aug 74,
MAY 75 49P Connolly,Donald W. ;Spanier, Gerard ;Champion,Florence ;
REPT. NO. FAA-NA-74-54
PROJ: FAA-161-111-000
MONITOR: FAA-RD 75-39

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Human factors engineering, *Color vision, *Cathode ray tubes, Display systems, Air traffic controllers, Feasibility studies, Colors, Visual perception, Information systems, Performance, Radar equipment (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The goals of these tests and analyses were to evaluate the potential operational utility and the technical capability of color cathode-ray displays for air traffic control (ATC) purposes. Color illustrations reproduced in black and white. (U)

AD-A010 594 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report: Cannon AFB, New Mexico, (U)

APR 75 99P Smith,David E. ;
REPT. NO. 74/66R-30

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar stations, *Airport radar systems, Air traffic control systems, Search radar, Radar beacons, Approach, Performance(Engineering), Air Force facilities, New Mexico (U)
IDENTIFIERS: AN/FPN-47, AN/TPX-42, AN/FPN-16, Evaluation, Cannon Air Force Base (U)

The Traffic Control and Landing System (TRACALS) radar station evaluation report presents data collected to define the capabilities and limitations of the Radar Approach Control (RAPCON) facility located at Cannon AFB, NM. The evaluation period was 6-16 Dec 74. The Cannon facility is comprised of an AN/FPN-47 (Airport Surveillance Radar), AN/TPX-42 (Air Traffic Control Radar Beacon System), AN/FPN-16 (Precision Approach Radar), and associated power systems. Evaluation results have assessed that the ASR does not satisfy mission requirements with the commissioned ASR antenna tilt of 4.0 degrees. ATCRBS false targets were numerous and apparently caused by reflections from hangars. Also, PAR service to runway 21 is hampered by the presentation of trains on the azimuth and elevation scopes. Included in this report are performance predictions and ananalysis of flight performance data. (U)

AD-A010 474 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Simulation of the Air Traffic Control Radar Beacon System (SOAR) with Application to a Discrete Address Beacon System. Volume II. Appendixes. (U)

DESCRIPTIVE NOTE: Final rept. Dec 73-Mar 74,
APR 75 108P Kleiman,Louis A. ;Miner, Mary Jane ;
REPT. NO. TSC-FAA-74-23-2
MONITOR: FAA-RD 75-35-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A010 473.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Computerized simulation, Surveillance, Transponders, Computer programs, FORTRAN (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

;Contents: Transponder reply rate limit control model for ATCRBS simulation; Effects of lengthening suppression time; Second-miss statistics; Legend for data-related parameters. (U)

AD-A010 473 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Simulation of the Air Traffic Control Radar Beacon System (SOAR) with Application to a Discrete Address Beacon System. Volume I. Text. (U)

DESCRIPTIVE NOTE: Final rept. Dec 73-Mar 74,
APR 75 197P Kleiman,Louis A. ;Miner, Mary Jane ;
REPT. NO. TSC-FAA-74-23-1
MONITOR: FAA-RD 75-35-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A010 474.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, Computerized simulation, Surveillance, Computer programming, FORTRAN (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

The report describes a computer simulation of the Air Traffic Control Radar Beacon System (ATCRBS). Operating on real air traffic data and actual characteristics of the relevant ground interrogators, the FORTRAN program re-enacts system operation in a pulse-by-pulse manner. The level of detail thus incoprorated into the program structure enables a computer-generated representation of the air traffic controller's display to be produced. The versatility of the simulation model is further evidenced by the incorporation of program modifications which also make possible investigation of the Discrete Address Beacon System (DABS). These program modifications permit examination and evaluation of the effectiveness of DABS interrogations in an ATCRBS environment. Results of simulation of DABS operation in a 1980 interrogator environment are furnished in this document. (U)

AD-A010 266 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

An Overview of the FAA Engineering and Development Programs with Highlights of Fiscal Years 1975-1976. (U)

APR 75 31P
REPT. NO. FAA-EM-75-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 74, AD-776 682.
DESCRIPTORS: *Air traffic control systems, *Aviation safety, *Systems analysis, *Airports, Management planning and control, Reviews, Automation, Radar beacons, Microwave equipment, Collision avoidance, Wake (U)
IDENTIFIERS: Fatality reduction (U)

This document is intended to supplement and update the information presented in the FY 1974-1975 overview. The primary attention is given to highlights and accomplishments in FY 1975 and to expected progress and accomplishments in FY 1976. A new section describes engineering and development activities oriented to the FAA's primary objective of increased safety. (U)

AD-A010 112 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Experimental Validation of PALM - A System for Precise Aircraft Location. (U)

DESCRIPTIVE NOTE: Technical note,
APR 75 120P Evans,J. E. ;Karp,D. ; LaFrey,R. R. ;McAulay,R. J. ;Stiglitz, I. G. ;
REPT. NO. TN-1975-29
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-242
PROJ: FAA-022-043-012, FAA-033-241-062
MONITOR: FSD TR-75-166

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Landing, Monitors, Transponders, Altitude (U)
IDENTIFIERS: DOT/4IZ/ID, PALM(Precision Altitude and Landing Monitors), Precision altitude and landing monitors (U)

A ground based system to precisely locate aircraft in three dimensions based on transponder replies has been designed. Field tests have been conducted to validate the design of the elevation performance. This document reports on the principle of operation, experimental hardware and field test of the Precision Altitude and Landing Monitor (PALM). The key features incorporated in the PALM design include: (a) no new avionics required, i.e., uses standard aircraft transponder; (b) high accuracy position data, i.e., a 1-mrad (0.06 degrees) rms error in elevation and in azimuth; (c) broad airspace coverage, e.g., 40 degrees in elevation, 120 degrees in azimuth (expandable to 360 degrees) and several 10s of miles in range; and (d) low life cycle equipment cost. The high accuracy in the difficult airport multipath environment is a direct result of (a) a newly developed antenna synthesis procedure, (b) the development of adaptive multipath suppression techniques, and (c) the use of digital signal processing. The program, to date, has focused on an experimental evaluation of the elevation performance. The electronics required for the tests have been built into a self-powered van to facilitate experiments at remote airports. (U)

AD-A009 662 17/7 9/5
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

FAA Lightning Protection Study: Lightning Protection Requirements for the ARTS III System. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Dec 74,
APR 75 38P Wilkinson,David R. ;Chen, Chin-Lin ;Peele,Warren D. ;
CONTRACT: DOT-FA72WAI-356
PROJ: FAA-9567-006
MONITOR: FAA-RD,GIDEP 75-70,E084-1787

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report from Post Doctoral Program. See also report dated Mar 75, AD-A009 010, rept. no. FAA-RD-75-50.
DESCRIPTORS: *Air traffic control terminal areas, *Protection, Lightning, Surges, Transients, Integrated circuits, Solid state electronics, Semiconductor devices, Resistance (U)
IDENTIFIERS: ARTS(Automated Radar Terminal Systems), Automated radar terminal systems, DOT/4IZ/ID, ARTS 3 system (U)

The withstand capabilities and the protection requirement for solid-state and integrated circuits of ARTS III susceptible to lightning-induced surges on the buried control and video cables are presented. Susceptible modules and components were identified from the circuit diagrams. If available, the manufacturer's data sheets are used to establish the withstand capabilities of diodes and transistors. Methods are described to estimate the withstand capabilities of other electronic components. In particular, the pulse handling capabilities of resistors is discussed in detail. The withstand voltage levels for each susceptible module and component are treated. A test waveform of (10x1000 microsecs) is used in the analysis. Recommended protection is listed in Appendix A. (U)

AD-A009 658 1/2 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION POLICY AND PLANS

A Stochastic Model of Controlled Airway Traffic. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 71 55P Dunlay,William J. , Jr;
REPT. NO. FAA-AV-71-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Flight paths, *Civil aviation, Networks, Mathematical models, Stochastic processes, Probability, Conflict, Capacity(Quantity), Mathematical prediction, Air traffic, Classification (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The model presented in this paper may be used to estimate the expected number of overtake, crossing and merging conflicts at one flight level of an airway network. In addition, procedures are described for estimating the workload and saturation capacities of the network. A number of simplifying assumptions facilitate the analysis. Among these are (1) poisson arrival processes at all points, (2) constant aircraft velocities, and (3) aircraft paths that are coincident with charted airways, or otherwise predictable straight line segments. Each conflict model is essentially a conditional probability model given a particular pair of aircraft types which is then summed up over all possible aircraft-type pairs to obtain the unconditional conflict probabilities. A discussion of possible extensions of the model is included at the end of the report. (U)

AD-A009 429 17/7 17/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Link Performance Considerations. (U)

DESCRIPTIVE NOTE: Project rept.,
APR 75 61P Schlieckert,G. J. ;
REPT. NO. ATC-41
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-186

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Data links, Beacons, Performance(Engineering), Fading(Electromagnetic waves) (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

The DABS link performance is computed using the present values for the system operating parameters and the available models that describe environmental and aircraft antenna effects. The various fade mechanisms are described, and a statistical determination of performance if proposed. The performance is computed for various sets of conditions including different ground antennas, aircraft maneuvers, antenna pedestal heights, ground reflection coefficients and reduced power. Also discussed are the effects of obstructions and the performance when aircraft are in the cone of silence. The DABS link is found to have very good overall performance with only small regions of reduced reliability that are at low angles or due to maneuvers. Those missed replies due to maneuvers are found to be sporadic from scan to scan. (U)

AD-A009 307 17/7
MITRE CORP ATLANTIC CITY N J

Discrete Address Beacon System/Air Traffic Control Interface Configuration Document. Volume II. Enroute Hardware for Phase I. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 74 34P Wescott,R. A. ;
REPT. NO. MTR-4243-Vol-2
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-165-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A001 541.
DESCRIPTORS: *Air traffic control systems, Beacons, Interfaces, Processing, Message processing (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

The document defines the En Route hardware interfaces to be used for Phase I DABS/IPC testing and CMA testing involving NAFEC facilities and the Discrete Address Beacon System Experimental Facility (DABSEF). The interfaces described herein were previously described in the WP-8859 series which this document supersedes. It is intended that this document provide the base line for En Route interface hardware configuration control. (U)

AD-A009 299 17/7 1/3
MITRE CORP MCLEAN VA

Consolidation of U.S. Oceanic Air Traffic Control Centers in Pre-Aerosat Era. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 75 182P Keblawi,Feisal S. ;Scardina, John A. ;
REPT. NO. MTR-6880
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 75-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Automation, Feasibility studies, Cost effectiveness, Air traffic, Air traffic controllers, Trade off analyses, Cost analysis (U)
IDENTIFIERS: DOT/4DZ/DA, DOT/4IZ/ID, Oceanic air traffic, Traffic management (U)

This document presents a study of the technical feasibility and cost benefits of consolidating and automating the three Atlantic Oceanic Air Traffic Control (ATC) centers (San Juan, Miami, and New York) into one center and the three Pacific oceanic ATC centers (Anchorage, Oakland, and Honolulu) into another center. The study focused on the era prior to the introduction of oceanic satellite systems for communications and surveillance. The scope of the study involved deriving traffic estimates, sizing the automation system for the estimated traffic, estimating controller staffing requirements, estimating requirements and availability of floor space for the operations room and computer equipment, and sizing the added communications requirements of the consolidated centers. (U)

AD-A009 215 17/7 1/2
MITRE CORP MCLEAN VA

Intermittent Positive Control Computer Algorithms for Test Bed Experiments. (U)

APR 75 127P McFarland,A. L. ;Golden, J. F. ;
REPT. NO. MTR-6528-Rev-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-2-Rev-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Revision of report dated Oct 73, AD-773 409.
DESCRIPTORS: *Air traffic control systems, *Collision avoidance, Warning systems, Algorithms, Ground to air communications, Data links, Display systems, Air traffic, Surveillance, Decision making, Aviation safety (U)
IDENTIFIERS: IPC(Intermittent Positive Control), Intermittent positive control, DOT/ 4IZ/ID (U)

The document is to be used with the OSEM approved Intermittent Positive Control system description to initiate the programming of the IPC test bed systems. It applies to both the Discrete Address Beacon System Experimental Facility at MIT Lincoln Laboratories and the IPC Phase I experiments at NAFEC. Detailed flowcharts are provided and logical system interfaces discussed. (U)

AD-A009 192 17/7 17/2.1
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report Altus AFB, Oklahoma: Evaluation Period 11-21 November 1974. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
APR 75 91P Wallachy,Bruce E. ;
REPT. NO. 74/66C/26

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Radio equipment, Performance(Engineering), Air Force facilities (U)
IDENTIFIERS: Altus Air Force Base, Evaluation (U)

The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control VHF/UHF communication system. Included in this report are results and analysis of equipment checks, a loop test line level diagram, line of sight coverage data, and results and analysis of airborne measurements. The data presented in this report can be used as a guide for anticipated performance of the system until there is an addition, deletion relocation of equipment, or change in horizon profile which would affect the system. (U)

AD-A009 011 17/7 1/2
MITRE CORP MCLEAN VA

Statistical Summary of the 1983 Los Angeles Enroute Center Standard Traffic Model. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 74 39P Cohen,Saul ;
REPT. NO. MTR-6676
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-RD 74-43

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jun 74, AD-781 387.
DESCRIPTORS: *Air traffic control systems, Air traffic, Computerized simulation, Statistical data, Instrument flight, Models, California, Computer programs, Aviation safety (U)
IDENTIFIERS: Los Angeles(California), DOT/4IZ/ID, DOT/4HZ/HC (U)

The 1983 Los Angeles Center Standard Traffic Model, a scan-to-scan computer generated air traffic simulation, is statistically summarized. The distributions of traffic by speed, altitude, density and various aircraft categories are presented. In addition, 1973 distributions are displayed for comparison to 1983. The following list refers to related reports: Report Nos. FAA-RD-73-86; FAA-RD-73-87-I; FAA-RD-73-87-II; FAA-RD-88; FAA-RD-73-89 and FAA-RD-74-42. (U)

AD-A008 940 17/7
MITRE CORP MCLEAN VA

An Overview and Assessment of Plans and Programs for the Development of the Upgraded Third Generation Air Traffic control System. (U)

MAR 75 227P
REPT. NO. M73-237-Rev-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 75-5

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Assessment, Management planning and control, Beacons, Automation, Landing aids (U)
IDENTIFIERS: DOT/4IZ/ID, Discrete address beacon systems, DABS(Discrete Address Beacon Systems), Microwave landing systems, Wake vortex avoidance systems (U)

The document presents information on the scope, rationale, costs, schedules, and possible benefits of the air traffic control system being developed for operational use in the 1980's and well into the 1990's. The ATC system currently in use, the Third Generation ATC System, is described and the need for improvements are identified. The goals and objectives of the Upgraded Third Generation System (UG3RD) are discussed. Forecasts of future air traffic through 1975 are shown. The fact that the need for development of the major features of the UG3RD is relatively independent of forecasts of traffic growth is shown. The nine major features of the UG3RD are discussed in some length including need, objectives, technical description, benefits, major issues, implementation considerations, benefits, and schedules, major milestones and resource requirements through FY83. The way in which each major feature contributes toward achieving the overall goals and objectives is discussed. Overall development costs are presented along with gross estimates of F and E costs. The needs for longer term improvements are mentioned. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A008 926 17/7
NATIONAL AVIATION FACI''TIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Electromagnetic Interference Specification Limits for Air Route Traffic Control Centers. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Oct 74,
MAR 75 112P Stone,Margaretta V. ;
REPT. NO. FAA-NA-75-150
CONTRACT: DOT-FA72-NA-728
MONITOR: FAA-RD 75-29

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Electromagnetic interference, Specifications, Measurement, Electronic equipment (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The report consists of a specification, covering the test limits for measurement of electromagnetic interference (EMI) characteristics of electronic equipment, intended to be installed in Air Route Traffic Control Centers (ARTCC's) by the Federal Aviation Administration (FAA). Limits and requirements for both emission and susceptibility are included. The limits are based on an analysis of radiated and conducted emission levels, found during EMI tests performed at three ARTCC's. The specification also contains guidance for selection of specific limits for various ARTCC areas, and outlines of suggested procedures for performing tests. These procedures are based on those contained in MIL-STD-462. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A008 925 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Electromagnetic Interference Measurements in Electronic Voice Switching Equipment Areas. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 75 73P Stone,Margaretta V. ;
REPT. NO. FAA-NA-74-169
CONTRACT: DOT-FA72-NA-728
MONITOR: FAA-RD 75-28

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Electromagnetic interference, Voice communications, Communication equipment, Switching, Electromagnetic compatibility, Measurement (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The report describes a measurement program, performed to determine electromagnetic interference characteristics of spaces in the Denver ARTCC and at the Millville, NJ RCAG site, where components of the Electronic Voice Switching (EVS) system may be installed. Test areas included an EVS junction module area, an EVS back room equipment area (both at the Denver ARTCC) and an EVS RCAG equipment area at the Millville, NJ site. (U)

AD-A008 896 17/7

NATIONAL WEATHER SERVICE STERLING VA TEST AND EVALUATION LAB

Evaluation of a Digital Display System (DDS) Driven by an Automatic Meteorological Observing System AMOS III-70. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 75 32P Hoehne,Walter E. ;
CONTRACT: DOT-FAA-ER-450-012A/B
MONITOR: FAA-RD 75-17

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Display systems, Digital systems, Meteorological data (U)
IDENTIFIERS: DOT/4IZ/ID (U)

An evaluation was conducted of a Digital Display System (DDS) Driven by an Automatic Meteorological Observing System AMOS III-70 for Limited Aviation Weather Reporting Station (LAWRS). The AMOS III-70, the electronics and one display panel were at the LAWRS facility in Reading, Pennsylvania. A second panel and a teletypewriter were at the Sterling Research and Development Center (SR and DC) in Sterling, Virginia. Data as displayed on the panel was compared with that transmitted directly by the AMOS-III 70 and with data transmitted via Service A. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A008 798 17/7 17/2

FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report, Vance AFB, Oklahoma. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
OCT 74 74P Wallachy,Bruce E. ;
REPT. NO. 74/66C-25

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Air Force facilities (U)
IDENTIFIERS: Evaluation (U)

A Traffic Control and Landing Systems (TRACALS) Communications Station evaluation was performed at Vance AFB, OK (2110 Comm Sq) 7 through 16 October 1974. The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control VHF/UHF communication system. Included in this report are results and analysis of equipment checks, a loop test line level diagram, line of sight coverage data, and results and analysis of airborne measurements. The data presented in the report can be used as a guide for anticipated performance of the system until there is an addition, deletion, relocation of equipment, or change in horizon profile which would affect the system. (U)

AD-A008 722 17/7 1/3
MASSACHUSETTS INST OF TECH CAMBRIDGE ELECTRONIC SYSTEMS LAB

Application of Modern Control Theory to Scheduling and Path-Stretching Maneuvers of Aircraft in the Near Terminal Area, (U)

OCT 74 30P Athans,Michael ;
REPT. NO. ESL-R-574
CONTRACT: AF-AFOSR-2273-72, NGL-22-009-124
PROJ: AF-9769, MIT-OSP-76265
TASK: 976901
MONITOR: AFOSR TR-75-0560

UNCLASSIFIED REPORT

Availability: Microfiche copies only.
DESCRIPTORS: *Terminal flight facilities, *Air traffic, *Scheduling, *Control theory, Air traffic control systems, Acceleration, Deceleration, Aircraft landings, Takeoff (U)

The purpose of this paper is to present a design concept for the dynamic control of aircraft in the near terminal area. An arbitrary set of nominal air routes, with possible multiple merging points, all leading to a single runway is considered. The system allows for the automated determination of acceleration/deceleration of aircraft along the nominal air routes, as well as for the automated determination of path-stretching delay maneuvers. In addition to normal operating conditions the system accommodates (a) variable commanded separations over the outer marker (to allow for takeoffs between successive landings) (b) emergency conditions (in the sense that an aircraft is given partial or complete priority for landing). The system design is based upon the combination of three distinct optimal control problems: (a) a standard linear-quadratic problem, (b) a parameter optimization problem, and (c) a minimum-time rendezvous problem. Simulation results involving twelve aircraft under both normal and emergency conditions will also be presented. (U)

AD-A008 439 17/7
AEL SERVICE CORP FARMINGDALE N J

Radio Frequency Interference (RFI)/ Electromagnetic Interference (EMI) Measurements Air Route Traffic Control Centers. (U)

DESCRIPTIVE NOTE: Final rept. Aug 72-Jul 73,
APR 75 380P Stone,Margaretta V. ;
CONTRACT: DOT-FA72NA-728
MONITOR: FAA-RD,FAA-NA 75-30,74-174

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared by AEL Service Corp., Farmingdale, N.J.
DESCRIPTORS: *Air traffic control systems, *Electromagnetic interference, Radiofrequency interference, Emission, Measurement, Automation, Electrical equipment, Electronic equipment (U)
IDENTIFIERS: DOT/41Z/ID (U)

The report describes electromagnetic interference tests at three Air Route Traffic Control Centers (ARTCC's). These were the Los Angeles ARTCC, Palmdale, California, the Oakland ARTCC, Fremont, California, and the New York ARTCC, Islip, Long Island, New York. The tests included measurement of radiated and conducted emission from both the automated system and nonautomated equipments, and radiated and conducted susceptibility of the automated system. (U)

AD-A008 383 17/7

NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Reliability Analysis of the System Maintenance Monitor Console. (U)

DESCRIPTIVE NOTE: Final rept. Sep 72-Dec 74, MAR 75 85P Moss,Arthur R. ;
REPT. NO. FAA-NA-74-53
PROJ: FAA-121-101-050
MONITOR: FAA-RD 75-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Monitors, Maintenance equipment, Consoles, Reliability, Maintainability, Lamps, Subminiature electrical equipment, Indicators (U)
IDENTIFIERS: DOT/4IZ/IB, National airspace system (U)

The specification for the system maintenance monitor console (SMMC) calls for a minimum mean uptime (MUT) of 5 000 hours and a maximum mean downtime (MDT) of 1 hour for each SMMC module type. Formal MUT and MDT tests were performed in accordance with approved test plans. A major cause of concern has been the high replacement rate and limited availability of the type 247 subminiature lamps used in the projection readout indicators (PRI's). Detailed replacement studies of these lamp failures brought out that an average of two lamps per day per SMMC failed. Comparative life tests were performed between the type 247 and three alternative type lamps, types 6180, 714, and 685. Types 714 and 685 showed significantly greater mean lives but lower luminosities than the 247. Human factors studies are being planned to determine the suitability of using lamps of lower luminosity. (U)

AD-A008 382 17/7 17/9

TEXAS INSTRUMENTS INC DALLAS

ASDE-2 RELIABILITY IMPROVEMENT STUDY. Volume II: Modulator, Receiver and Indicator Interface Recommendations. (U)

DESCRIPTIVE NOTE: Final rept. Jul 72-Mar 73, NOV 74 75P Grover,David N. ;Butler,C. Norman ;
CONTRACT: DOT-TSC-445
MONITOR: FAA-RD,TSC 74-195-Vol-2,FAA-74-4-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A008 381.
DESCRIPTORS: *Airport radar systems, *Search radar, Air traffic control systems, Reliability(Electronics), Radar receivers, Modulators, Indicators, Radar equipment, Interfaces, Costs, Trade off analyses (U)
IDENTIFIERS: DOT/4IZ/IE, ASDE-2 Radar, ASDE(Airport Surface Detection Equipment), Airport surface detection equipment (U)

Eight airport sites and the FAA Oklahoma Depot were visited and surveys conducted to obtain reliability, maintainability and performance data on the ASDE-2 Radar System. The data was analyzed and recommendations for modification to the equipment made based on cost/benefit trade-offs. Three electronic modifications were recommended: modulator, local oscillator, and solid state duplexer modifications. (These modifications have since been accomplished.) To increase the operational utility of the ASDE-2 Radar, a bright display is recommended and, where space permits in the control tower, multiple displays. The report contains detailed information on ASDE-2 reliability/maintainability, operational status, performance, and future ASDE system considerations as of March 1973. The report is in two Volumes: Vol. I: Operational Data and Modification and Vol. II: Modulator, Receiver, and Indicator Interface Recommendations (U)

AD-A008 381 17/7 17/9
TEXAS INSTRUMENTS INC DALLAS

ASDE-2 RELIABILITY IMPROVEMENT STUDY. Volume I: Operational Data and Modification Recommendations. (U)

DESCRIPTIVE NOTE: Final rept. Jul 72-Mar 73,
NOV 74 193P Grover,David N. ;Butler,C. Norman ;
CONTRACT: DOT-TSC-445
MONITOR: FAA-RD,TSC 74-195-Vol-1,FAA-74-4-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A008 382.
DESCRIPTORS: *Airport radar systems, *Search radar, Air traffic control systems, Reliability(Electronics), Maintainability (U)
IDENTIFIERS: DOT/4IZ/IE, ASDE-2 Radar, ASDE(Airport Surface Detection Equipment), Airport surface detection equipment (U)

Eight airport sites and the FAA Oklahoma Depot were visited and surveys conducted to obtain reliability, maintainability and performance data on the ASDE-2 Radar System. The data was analyzed and recommendations for modification to the equipment made based on cost/benefit trade-offs. Three electronic modifications were recommended: modulator, local oscillator, and solid state duplexer modifications. (These modifications have since been accomplished.) To increase the operational utility of the ASDE-2 Radar, a bright display is recommended and, where space permits in the control tower, multiple displays. The report contains detailed information on ASDE-2 reliability/maintainability, operational status, performance, and future ASDE system considerations as of March 1973. The report is in two Volumes: Vol. I: Operational Data and Modification Recommendations and Vol. II: Modulator, Receiver and Indicator Interface Recommendations. (U)

AD-A008 378 6/19 6/1 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Comparison of OPA LOCKA Tower with Other ATC Facilities by Means of a Biochemical Stress Index. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 74 14P Melton,C. E. ;McKenzie, J. M. ;Saldivar,J. T. , Jr.;Hoffmann,S. M. ;
REPT. NO. FAA-AM-74-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Stress(Physiology), *Catecholamines, *Air traffic controllers, Indicators, Aviation personnel, Urine, Excretion, Biochemistry, Operators(Personnel), Heart, Stress(Psychology), Tables(Data) (U)

Physiological and biochemical measurements of stress in 14 Opa Locka Tower (OPF) controllers indicated that the principal stressor at that facility was the heavy volume of air traffic. Controllers responded to this stressor with a large increase in urinary output of catecholamines. A stress index, Cs, shows that OPF ranks second in stressfulness in the nine stress studies carried out at eight ATC facilities. Baseline values show that off-duty stress at OPF is low. The results of this study emphasize that a battery of tests is necessary for adequate definition of stress in this personnel group. (U)

AD-A007 623 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - En Route Control. (U)

FEB 75 92P
REPT. NO. FAA-ED-12-2A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated Jun 72, AD-751 990.
DESCRIPTORS: *Air traffic, *Air traffic control systems, *Data processing, Management planning and control, Navigational aids, Scheduling, Air traffic controllers, Automata (U)
IDENTIFIERS: Enroute automation, Enroute air traffic, Traffic management, DOT/4DZ/DA, DOT/4IZ/ID (U)

Implementation of the Third Generation En Route ATC System, Model A3d2, provides basic automation capability for processing flight data and surveillance functions. Substantial upgrading of this basic capability is needed to meet the demand forcast for the en route system through the 1970's and into the 1980's. This document describes the development plan to build the features and functions necessary for upgrading the present Third Generation En Route System. Program objectives, development activities, implementation considerations, and resource estimates are set forth. (U)

AD-A007 621 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Discrete Address Beacon System (DABS) Uplink Encoder. (U)

DESCRIPTIVE NOTE: Project rept., MAR 75 46P Samson,J. R. ;
REPT. NO. ATC-40
CONTRACT: DOT-FA72WAI-261, F19628-73-C-0002
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-162

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 25 Apr 74, AD-778 387.
DESCRIPTORS: *Air traffic control systems, Data links, Coders, Data transmission systems, Errors, Beacons (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, DOT/4IZ/ID (U)

This report explains the operation of the DABS uplink encoder and provides information useful in diagnosing its performance. Several techniques which may be useful in analyzing encoder operation are presented. One technique involves only the use of address-parity tables and modulo-2 addition. The address-parity tables included are based upon the encoding polynomial prescribed in 'Provisional Signal Formats for the Discrete Address Beacon System,' Lincoln Laboratory Project Report ATC-30 Rev. 1, dated 25 April 1974. The error detection and correction properties of polynomial encoding schemes are not the subject of this report. (U)

AD-A007 041 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Radar Station Evaluation Report, Pease AFB, N.H. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
DEC 74 98P Cranston,Robert L. ;
REPT. NO. 74/66-27

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar stations, Ground controlled approach radar, Airport radar systems, Radar beacons, Air force facilities, New Hampshire, Performance (U)
IDENTIFIERS: AN/FPN-47, AN/FPN-16, AN/GPX-98, Pease Air Force Base, Evaluation, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The radar Traffic Control and Landing Systems (TRACALS) station evaluation report presents data collected, 15-25 Oct 1974, to define the capabilities and limitations of the Radar Approach Control Facility located at Pease AFB, N.H. The facility is comprised of an AN/FPN-47 radar set, AN/FPN-16 radar set, AN/GPX-98 Air Traffic Control Radar Beacon System (ATCRBS), and associated power systems. Included in this report are descriptions of the fringes of the useable radar coverage; Line of Sight Diagrams; ATCRBS coverage and tracking capabilities; analysis of flight and performance data; and performance predictions for these systems. The data presented in this report can be used as a guide for anticipated performance until there is an addition, deletion or relocation of equipment which would change the facility's capability or until a change occurs in the horizontal screening profile. (U)

AD-A006 789 17/7 5/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

A Realistic View of the People in Air Traffic Control, (U)

DEC 74 9P Smith,Roger C. ;
REPT. NO. FAA-AM-74-12
PROJ: FAA-AM-A-72-PSY-34, FAA-AM-B-73-PSY-34

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Human relations, Surveys, Personality, Aptitudes, Motivation, Interpersonal relations, Attitudes(Psychology), Pattern recognition, Personnel management (U)

An overview of research findings on air traffic controllers is presented. Results of personality, aptitude, motivation, interest, and attitude studies are considered in terms of the general pattern of characteristics found to be associated with success in the air traffic profession. The implications of these findings for managerial programs is discussed. (U)

AD-A006 759 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Channel Management, (U)

JAN 75 246P Kelly,E. J. ;
REPT. NO. ATC-43
CONTRACT: DOT-FA-72WAI-261
MONITOR: FAA-RD 74-197

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Project Discrete Address Beacon System.
DESCRIPTORS: *Air traffic control systems, Data links, Beacons, Channels, Management, Interrogation, Scheduling (U)
IDENTIFIERS: DOT/4IZ/ID, DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The report provides a full discussion of the design of the DABS channel management function. Channel management regulates all activity on the RF channel, scheduling ATCRBS interrogations and DABS roll-call interrogations and replies. Channel management arranges for multiple interrogations when required to satisfy both the surveillance and the communications functions of the sensor, and for reinterrogations in the event of link failure. The report consists of three major parts: Part I, Channel Control; Part II, Roll-Call Scheduling; and Part III, Transaction Preparation, Target List Update, and Transaction Update. Together they encompass the five basic subfunctions of channel management. (U)

AD-A006 687 17/7 17/9
FACILITY CHECKING SQUADRON (1868TH) (AFCS) APO NEW YORK 09332

Station Evaluation Report, Zweibrucken Air Base, Germany. (U)

DESCRIPTIVE NOTE: TRACALS evaluation rept.,
DEC 74 163P Burkard,Dick J. ;Selby, Terry W. ;
REPT. NO. 74/68-RTC-12

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar stations, Ground controlled approach radar, Airport radar systems, TACAN, Communication and radio systems, Radar beacons, Performance, Air Force facilities, West Germany (U)
IDENTIFIERS: AN/MPN-13, AN/TRN-31, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, Evaluation, Zweibrucken Air Force Base (U)

The report presents data collected to define the capabilities and limitations of the Ground Controlled Approach (GCA) Facility, AN/MPN-13; Tactical Air Navigation (TACAN) System, AN/TRN-31; and Air Traffic Control Communications at Zweibrucken Air Base, Germany. Included in the report are the descriptions of the airport surveillance radar (ASR) upper, lower, outer and inner fringes of usable coverage, coverage diagrams, and analysis of equipment performance data; Air Traffic Control Radar Beacon System (ATCRBS) coverage, tracking capabilities and analysis of its equipment performance data; a description of the lower outer and inner fringes of usable TACAN coverage, coverage diagrams and analysis of airborne and ground performance data. Also included are the precision approach radar (PAR) equipment performance data, analysis of its performance data and the analysis of the performance data of the Air Traffic Control ground-air-ground equipment used by the control tower and GCA. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A006 603 5/9
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA

Training of U.S. Air Traffic Controllers. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 75 277P Henry,James H. ;Kamrass, Murray E. ;Orlansky,Jesse ;Rowan,Thomas C. ; String,Joseph ;
REPT. NO. R-206
CONTRACT: FA-74-WAI-446

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, Training, Selection, Performance(Human), Measurement, Simulators, Costs, Employment, Budgets, Quality control, Standardization (U)

After a brief review o. the evolution of existing national programs for air traffic controller training, an estimate is prepared of the number of individuals who will require developmental and supplementary training. The present controller selection and training programs are then examined, leading to an investigation of the methods available to measure performance and to establish competence on the job. The role of standardization and quality control is then addressed. The capabilities and limitations of existing simulation devices for air traffic control training are considered. Alternative ways of meeting the training needs of developmentals are identified and compared on a cost basis. Finally, attention is given to (a) simulators and centralized and noncentralized training, (b) the training budget, (c) future requirements of training, (d) R and D for training, (e) hiring practices, (f) standardization, and (g) the training load at the FAA Academy. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A006 268 17/7
INSTITUTE FOR TELECOMMUNICATION SCIENCES BOULDER COLO

Multipath in Air Traffic Control Frequency Bands. Volume II. Chapters CIII through GIV, General Bibliography, (U)

JUL 74 470P Hartman,William J. ;
CONTRACT: DOT-FA72WAI-239
MONITOR: FAA-RD 74-75-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD/A-006 267.
DESCRIPTORS: *Air traffic control systems, *Multipath transmission, Very high frequency, Ultrahigh frequency, Microwave frequency, Fading(Electromagnetic waves), Attenuation, Refractive index, Scintillation, Loran, Hyperbolic navigation, Radar beacons, Doppler effect, Diversity reception (U)
IDENTIFIERS: DOT/4IZ/ID, Omega navigation system (U)

;Contents: The refractive index in the troposphere between 100 MHz and 100 GHz; Tropospheric multipath mechanisms;'Other atmospheric effects; Techniques for computing refraction of radio waves in the troposphere; Global scintillation model; Molecular transfer characteristics of air between 40 and 140 GHz; Doppler effects; Methods for reducing the effects of multipath; Multipath calculations for a VOR site; Multipath effects at low frequencies with particular reference to the Loran-C Radio Navigation System; Multipath for the Omega System; Multipath problem for beacon radar. (U)

AD-A006 267 17/7
INSTITUTE FOR TELECOMMUNICATION SCIENCES BOULDER COLO

Multipath in Air Traffic Control Frequency Bands. Volume I. Classification of Multipath, Effects of Multipath on Systems, and Causes of Multipath. (U)

JUL 74 300P Hartman,William J. ;
CONTRACT: DOT-FA72WAI-239
MONITOR: FAA-RD 74-75-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD/A-006 268.
DESCRIPTORS: *Air traffic control systems, *Multipath transmission, Very high frequency, Ultrahigh frequency, Microwave frequency, Fading(Electromagnetic waves), Attenuation (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The handbook has collected theories and techniques which have one or more of the following qualities: It has been in frequent use by engineers; it has been shown to be accurate; it can be applied to a wide variety of problems; it offers an easily obtainable upper or lower bound. Most of the problems arising because of multipath cannot be solved or described precisely, but instead involve assumptions or approximations, the effects of which cannot be quantified. The responsibility for the decision on which approximation or assumption to use for a particular problem is with the reader. Since the handbook is directed toward air traffic control (ATC) frequencies, most of the material presented is oriented toward frequencies above VHF, and toward line-of-sight paths. Two special sections, one on Omega and one on Loran are included. No information on HF propagation or ionospheric matter is included. Finally, selection of the material in this handbook has been heavily influenced by the systems presently used by the FAA. (U)

AD-A006 263 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Preliminary Two-Dimensional Area Navigation Terminal Simulation. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Mar 74,
FEB 75 111P Maurer,John ;O'Brien,Paul J. ;Crimbring,William ;
REPT. NO. FAA-NA-74-16
PROJ: FAA-044-326-020
MONITOR: FAA-RD 74-209

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Navigation, Air traffic control terminal areas, Simulation, Air traffic controllers, Job analysis (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The simulation study analyzed selected controller workload and system performance measures for two route configurations representing two time frames and various percentage mixes of area navigation (RNAV) and non-RNAV operations, referred to in this report as participation levels. Results indicated that controllers could use RNAV maneuvers in the control of traffic in lieu of radar vector techniques and that controller workload decreased as the RNAV participation level increased. Controller acceptance of RNAV principles and techniques in terminal ATC increased as familiarity and experience with the various RNAV functions were gained. Subjective results pointed out that in order that RNAV be an effective tool within the terminal air traffic system, adequate training and a thorough familiarization with RNAV procedures, capabilities, and limitations would be a requirement for both controllers and pilots. (U)

AD-A005 988 17/7 5/8
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Data Link Short-Message Cockpit Display Test. (U)

DESCRIPTIVE NOTE: Final rept., DEC 74 125P Larson,Donald ;
REPT. NO. FAA-NA-74-1
PROJ: FAA-062-222-000

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Display systems, Cockpits, Data links, Digital systems, Human factors engineering, Matrix displays, Light emitting diodes, Fiber optics, Cathode ray tubes (U)
IDENTIFIERS: DOT/4IZ/ID, Evaluation (U)

Evaluation was made of four pilot/cockpit displays for air traffic control messates. The four displays were: (1) gas discharge, (2) light-emitting diodes, (3) fiber optics, and (4) cathode-ray tube displays. Data obtained were in the form of questionnaires and measured controller response time to the messages. The results will be used tc determine the optimum display for crew environment tests. It was found that, through training and practice, pilot crews can readily set up cockpit procedures and oeprate in an ATC data link display communications environment. This report documents a series of tests on cockpit input/output devices performed in a GAT-II cockpit simulator at the National Aviation Facilities Experimental Center during November 1973. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A005 788 17/7 17/2.1
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Impact of Satellite Aeronautical Cnannel on Modem Specifications. Phase II. Oceanic Multipath Measurements and Modem Concepts. (U)

DESCRIPTIVE NOTE: Final rept. Mar 73-Mar 74, JAN 75 195P Bello,Phillip A. ;Chase, David ;DeRosa,Joseph ;Weng,Lih-Jyh ;Bello, Martin G. ;
REPT. NO. TSC-FAA-74-27
CONTRACT: DOT-TSC-516
MONITOR: FAA-RD 74-215

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with CNR, Inc., Newton Upper Falls, Mass. See also report on Phase 1 dated Mar 74, AD-778 390.
DESCRIPTORS: *Air traffic control systems, *Modems, Multipath transmission, Satellite communications, Data links, Aircraft antennas, Performance(Engineering), Subroutines, FORTRAN (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The report completes the analysis initiated in the Phase I report of the effects of oceanic multipath on ranging and data modems for satellite air traffic control systems. The interaction between multipath antenna and apparent measured multipath is determined using a 'vector Kirchoff' model of ocean scattering. Procedures for antenna design, sea state sensing, and multipath measurements are detailed, and tone ranging performance is computed for various antenna designs. Consideration is given to the problem of tone probing on a 50 KHz hard limiting AEROSAT channel while data transmission is taking place. The problem of how much measurement time is needed to achieve a reliable measurement of error probability in data transmission over the AEROSAT channel is addressed. (U)

AD-A005 642 1/5 1/3
URBAN SYSTEMS RESEARCH AND ENGINEERING INC CAMBRIDGE MASS

The Chicago Midway Airport Study. Volume II. Methodology and Supporting Data. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 74 420P
CONTRACT: DOT-FA72WA-2816
MONITOR: FAA-QS 74-1-vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Battelle Columbus Labs., Ohio, and the MITRE Corp., McLean, Va. See also Volume 1, dated Jul 74, AD/A-003 943.
DESCRIPTORS: *Air transportation, *Airports, *Air traffic, Civil aviation, Urban planning, Air traffic control systems Capacity(Quantity), Land use, Illinois, Scheduling (U)
IDENTIFIERS: Midway Airport, *Transportation management, Chicago(Illinois), O'Hare International Airport (U)

This study investigates the implications of projected growth of commercial air transport demand in the Chicago area for operations at the region's airports. About 95% of commercial air passenger and flight movements in Chicago currently take place at O'Hare International Airport. Serious airport runway and ground access congestion problems are likely to result if this degree of concentration of commercial traffic continues into the mid-1980's. This study considers the increased airport system capacity which could result if a significant portion of the growth of commercial air transport activity were to take place at Chicago Midway Airport in the late 1970's and mid-1980's. (U)

AD-A005 569 17/7 9/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

An Analysis of Aircraft L-Band Beacon Antenna Patterns, (U)

JAN 75 115P Schlieckert,G. J. ;
REPT. NO. ATC-37
CONTRACT: F19628-73-C-0002, DOT-FA-72-WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-144

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Project report on Discrete Address Beacon System.
DESCRIPTORS: *Aircraft antennas, *Antenna radiation patterns, *Air traffic control systems, Beacons, L band, Gain, Jet transport planes, Commercial aircraft (U)
IDENTIFIERS: DOT/4IZ/ID, Boeing 727 aircraft, Cessna 150 aircraft, Piper Cherokee Arrow aircraft (U)

Radiation patterns are examined for L-Band beacon antennas mounted on aircraft ranging from small, single-engine, general aviation aircraft to the Boeing 747. The data analyzed consists of antenna gain values taken in two degree steps over a spherical surface centered at the antenna location. Data from three representative scale model aircraft are studied in detail and show the effects of various airframe structural members on the radiation lobing patterns and the relative performance of antennas located at a number of positions on each scale model aircraft. Significant observations were that: Landing gear and flaps complicate the lobing structure but do not introduce many more low gain values; In general, antennas mounted forward of the leading edge of the wing and on the fuselage bottom centerline (not too close to nosewheel) provide the best overall performance; As an aircraft maneuvers, antenna performance degrades in direct relationship with the severity of the roll or pitch. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A005 568 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Further Studies of ATCRBS Based on ARTS-III Derived Data. (U)

DESCRIPTIVE NOTE: Project rept.,
DEC 74 148P Cameron,A. G. ;
REPT. NO. ATC-38
CONTRACT: DOT-FA72WAI-242
MONITOR: FAA-RD 74-145

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, False targets, Interference, Data processing, Data links (U)
IDENTIFIERS: DOT/4IZ/ID, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, ARTS 3(Automated Radar Terminal System 3), Automated radar terminal system 3 (U)

The major topics considered are false targets caused by multipath reflections, and asynchronous interference (fruit). Four different mechanisms resulting in false targets were observed in the data and are discussed in detail in the report. In addition, levels of asynchronous interference as measured and analyzed, and two procedures are discussed by which the characteristics of the interrogators responsible for the fruit (including location) can be determined. One of these is described in detail, and shown to yield results that agree closely with known parameters. Several other topics including improper reply decoding, are also discussed. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A005 292 17/7 17/2
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

Communications Station Evaluation Report - Eglin AFB, Florida, (U)

OCT 74 101P Wallachy,Bruce E. ;
REPT. NO. 74/66C/24

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Very high frequency, Ultrahigh frequency, Performance(Engineering), Flight testing, Air Force facilities, Florida (U)
IDENTIFIERS: Elgin Air Force Base (U)

The purpose of the evaluation was to define the capabilities and limitations of the Air Traffic Control VHF/UHF communication system both in coverage and performance. Included in this report are evaluation procedures, results and analysis of equipment checks, a loop test line level diagram, weather data, line of sight coverage data, and results and analysis of the airborne flight tests. The data presented in this report can be used as a guide for anticipated performance of the system until an addition, deletion, or relocation of equipment which affects the system occurs. (U)

AD-A005 056 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS: A System Description. (U)

DESCRIPTIVE NOTE: Project rept.,
NOV 74 96P Drouilhet,P. R. ;
REPT. NO. ATC-42
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-24-012
MONITOR: FAA-RD 74-189

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Discrete Address Beacon System.
DESCRIPTORS: *Air traffic control systems, Beacons, Data links, Surveillance, Transponders, Detectors, Signal processing, Avionics, Performance(Engineering) (U)
IDENTIFIERS: DOT/4IZ/ID, *Discrete address beacon systems, DABS(Discrete Address Beacon Systems) (U)

The Discrete Address Beacon System (DABS) is a cooperative surveillance and communication system for air traffic control. It employs ground-based sensors (interrogators) and airborne transponders. Ground-to-air and air-to-ground data-link communications are accommodated integrally with the surveillance interrogations and replies. DABS has been designed as an evolutionary replacement for the current Air Traffic Control Radar Beacon System (ATCRBS) to provide the enhanced surveillance and communication capability required for air traffic control in the 1980s and 1990s. Compatibility with ATCRBS has been emphasized to permit an extended, economical transition. (U)

AD-A004 840 17/7 17/9
FACILITY CHECKING SQUADRON (1866TH) (AFCS) RICHARDS-GEBAUR AFB MO

TRACALS Evaluation Report. Radar Station Evaluation Report Duluth IAP, Minnesota, (U)

SEP 74 91P Cranston,Robert L. ;
REPT. NO. 74/66R/20

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar landing control, Radar beacons, Radar tracking, Radar stations, Radar antennas, Antenna radiation patterns, Radar cross sections, Minnesota (U)
IDENTIFIERS: AN/MPN-14, Duluth(Minnesota) (U)

This Radar Traffic Control and Landing Systems (TRACALS) station evaluation report presents data collected to define the capabilities and limitations of the Mobile Radar Approach Control Facility (AN/MPN-14) at Duluth International Airport, Minnesota. Included in the report are descriptions of the upper, lower, outer and inner fringes of the useable radar coverage; radar coverage diagrams; ATCRBS coverage and tracking capabilities; analysis of flight and performance data; and performance predictions of these systems. The data presented in this report can be used as a valid guide for anticipated performance until there is an addition, deletion or relocation of equipment which would change the facility's capability or until a change occurs in the horizontal profile. (U)

AD-A004 536 17/7 1/2
SYSTEMS CONTROL INC PALO ALTO CALIF

Horizontal Collision Avoidance Systems Study. (U)

DESCRIPTIVE NOTE: Final rept. Dec 72-Nov 73, DEC 73 272P Sorensen,J. A. ;Merz,A. W. ;Cline,T. B. ;Karmarkar,J. S. ;Heine, W. ;
CONTRACT: DOT-TSC-535
MONITOR: FAA-RD,TSC 73-203,73-36

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic, *Air traffic control systems, *Collision avoidance, Aviation safety, Level flight, Intercept trajectories, Interception probabilities, Flight paths, Digital simulation, Flight instruments, Miss distance (U)
IDENTIFIERS: DOT/4IZ/ID (U)

This report presents the results of an analytical study of the merits and mechanization requirements of horizontal collision avoidance systems (CAS). The horizontal and combined horizontal/vertical maneuvers which provide adequate miss distance with minimum initial range, minimum deviation off track, and acceptable turn rates are found. Horizontal maneuvers are compared with vertical maneuvers and speed control for collision avoidance in terms of initial range requirements, deviation off track and flight path time loss. Requirements for implementing an airborne horizontal CAS are outlined. Digital filtering is analyzed for estimating airspeed and relative heading from noisy range and bearing measurements between aircraft. An algorithm (suitable for airborne mechanization) is developed for computing appropriate collision avoidance maneuvers. The effects of dynamic and measurement errors on the CAS's ability to provide safe miss distance are examined. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A004 309 17/7 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Measurement and Analyses of ASR-4 System Error. Part III. Summary. (U)

DESCRIPTIVE NOTE: Final rept. Dec 69-Mar 70, DEC 74 73P Busch,Allen C. ;Bradbury, Paul W. ;
REPT. NO. FAA-NA-74-8
PROJ: FAA-142-177-010
MONITOR: FAA-RD 73-62-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 2, AD-766 609.
DESCRIPTORS: *Airport radar systems, *Air traffic control terminal areas, Search radar, Errors, Display systems, Systems analysis, Measurement, Analysis of variance (U)
IDENTIFIERS: ASR-4 radar, DOT/4IZ/ID (U)

The positional accuracy of aircraft radar targets displayed in an air traffic control airport surveillance radar system (ASR-4) was measured as one of the inputs essential for determining aircraft separation standards. In the report, Part III: Summary, data have been pooled for all like system response measures from two extensive data sets previously reported out as Phase I Data and Phase II Data (reflecting a difference in measurement instrumentation) in the associated report, Part II: Analyses, and an analysis of variance was then performed for the pooled expressions. In general, the pooled data show a tendency to be more homogeneous and less subject to extraneous effects. (U)

AD-A003 797 17/7
ROCKWELL INTERNATIONAL CORP CEDAR RAPIDS IOWA COLLINS RADIO GROUP

Three and Four Dimensional Area Navigation Study. (U)

DESCRIPTIVE NOTE: Final rept., JUN 74 216P Hemesath,N. B. ;
CONTRACT: DOT-FA72WA-3123
MONITOR: FAA-RD 74-150

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Air traffic, *Scheduling, Air traffic control terminal areas, Instrument flight, Flight paths, Navigational aids, Avionics (U)
IDENTIFIERS: Area navigation, DOT/4IZ/ID (U)

The results of analytical study and real time cockpit simulation of three and four dimensional airborne area navigation concepts for increasing aviation system capacity in the terminal area are presented in this report. Varying degrees of ATC capability, approach and landing aids, and airborne system capability are addressed. Analytical results present the airborne/ATC equipment accuracies necessary to support varying degrees of control precision. Results from the real time cockpit simulation indicate the degree of ATC/pilot and pilot/airborne equipment interaction necessary to obtain the time delivery precision predicted by the analytical results. All the airborne concepts rely on a high level ATC metering and spacing system. As a result airborne system complexity for each user type is held to a minimum and simultaneous ATC control of aircraft with mixed equipment capabilities can be accomplished. (U)

AD-A003 795 17/7
IIT RESEARCH INST CHICAGO ILL

Potential Interference of the Discrete Address Beacon System (DABS) on the X and Y Mode TACAN System. (U)

DESCRIPTIVE NOTE: Final rept., FEB 74 230P Willey,T. M. ;Wingard,J. L. ;
CONTRACT: DOT-FA70WAI-175, F19628-73-C-0031
MONITOR: ECAC,FAA-RD RR-74-003,74-14

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *TACAN, *Air traffic control systems, Distance measuring equipment, Radio beacons, Interrogators, Interference, Beacons, Microwave frequency (U)
IDENTIFIERS: DOT/4IZ/ID, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The impact of ten proposed signal formats of the Discrete Address Beacon System (DABS) on the performance of TACAN/DME equipments was investigated. The susceptibility of the individual TACAN/DME equipments to interference was then used to assess the interference impact of a hypothetical DABS environment on the operation of TACAN/DME systems. Worst case characterizations were used in some respects. A set of frequency-distance separations was developed that would prevent DABS interference to the TACAN interrogator, and limit the generation of deadtime in the TACAN beacon. (U)

AD-A003 794 17/7 17/2.1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan. (AEROSAT), Aeronautical Satellites. (U)

SEP 74 228P
REPT. NO. FAA-ED-17-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Satellite communications, *Air traffic control systems, Communication satellites, Atlantic Ocean (U)
IDENTIFIERS: DOT/4IZ/ID (U)

The program plan covers the planning, development, engineering, experimentation, and evaluation of an aeronautical satellite communication capability over the Atlantic Ocean. (U)

AD-A003 121 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

System Failure and Recovery Tests, NAS Enroute Stage A Model 3d2. (U)

DESCRIPTIVE NOTE: Final rept. Sep 73-Apr 74,
DEC 74 20P Fisher,Donald A. ;Hinkley, Lane G. ;
REPT. NO. FAA-NA-74-24
PROJ: FAA-121-101-050
MONITOR: FAA-RD 74-181

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Systems engineering, Failure, Recovery (U)
IDENTIFIERS: DOT/4IZ/ID, National Airspace System (U)

A series of tests of the National Airspace System Enroute Stage A Model 3d2 System was conducted at the National Aviation Facilities Experimental Center in a system environment in order to determine system behavior under conditions of hardware element failures and in order to determine the impact of the failures upon air traffic control operations. The report describes the results of these tests, but does not include later improvements or additions to the system which may have been included as a result of these tests or other similar activities. (U)

AD-A002 920 5/9 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Multiple Task Performance as a Predictor of the Potential of Air Traffic Controller Trainees: A Followup Study, (U)

NOV 74 6P Chiles,W. Dean ;West, Georgetta ;
REPT. NO. FAA-AM-74-10
PROJ: FAA-AM-A-71-PSY-29, FAA-AM-C-75-PSY-40

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Force personnel, *Air traffic controllers, *Performance(Human), Reviews, Statistical processes, Personnel development (U)

The current professional status of 229 air traffic controller trainees tested in an earlier series of complex performance studies was determined by reference to the official FAA personnel roster some 2 to 2 1/2 years later. Point-biserial correlations between the previously obtained performance measures and the retention/termination status of the trainees were computed; correlations were also computed between the criterion used in the earlier study (instructor ratings of trainee potential) and the retention criterion and between the Civil Service Commission (CSC) air traffic control specialist (ATCS) aptitude screening battery scores (where available) and the retention criterion. (U)

AD-A002 752 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C AVIATION FORECAST BRANCH

Index to FAA Regions and Air Route Traffic Control Centers. Fiscal Years 1975-1986. (U)

SEP 74 45P

UNCLASSIFIED REPORT

DESCRIPTORS: *Instrument flight, *Air traffic, *Air traffic control terminal areas, United States, Great Lakes, Alaska, Pacific Ocean Islands, Planning (U)

The report provides forecasts of IFR aircraft handled by FAA air route traffic control centers (ARTCC). It serves as a base for the FAA planning and budget process in determining future requirements for facilities, equipment, and manpower (U)

AD-A002 748 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Measurement and Analyses of ASR-4 System Error. Part I. Overview. (U)

DESCRIPTIVE NOTE: Final rept. Dec 69-Mar 70,
NOV 74 18P Busch,Allen C. ;Bradbury, Paul ;
REPT. NO. FAA-NA-74-55
PROJ: FAA-142-177-010
MONITOR: FAA-RD 73-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 2, AD-766 609.
DESCRIPTORS: *Air traffic control systems, *Airport radar systems, Radar targets, Radar tracking, Radar antennas, Position finding, Data acquisition (U)
IDENTIFIERS: ASR-4 radar, Aircraft separation (U)

The positional accuracy of aircraft radar targets as displayed in an air traffic control airport surveillance radar system (ASR-4) was sought as one of the inputs essential for determining aircraft separation standards. Using radar track input from the Atlantic City, New Jersey, ASR-4, the radar targets of two test aircraft executing flight patterns of varying relative spacing were photographed as displayed in both beacon and primary radar modes on scan-converted and PPI displays. The displayed positions were related to simultaneous precision track from single-target instrumentation radars (EAIR and TAIR) to derive error measures for range, azimuth, and separation. The extensive analysis program employed a 'least-squares' analysis of variance. (U)

AD-A002 415 17/7
SPERRY UNIVAC ST PAUL MINN DEFENSE SYSTEMS DIV

Augmented Radar Beacon Tracking Level System Design Specification. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 74 409P Huff,L. ;Wold,M. ;
REPT. NO. PX-7981-F
CONTRACT: DOT-FA70WA-2289
MONITOR: FAA-RD 74-169

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Radar tracking, Radar beacons, Specifications, Automation, Display systems (U)
IDENTIFIERS: DOT/4IZ/ID, Augmented radar beacon tracking level systems (U)

The document is a system specification for the Augmented Radar Beacon Tracking Level (RBTL) system. The Augmented RBTL expands the Beacon Tracking Level (BTL) ARTS III system by providing the capability of automatically tracking and displaying information on both non-beacon and beacon-equipped aircraft. In addition, this system provides improved tracking techniques together with new techniques for improving the controller-computer interface. The Augmented RBTL system expands the ARTS III system, but retains the ARTS III features. Primary radar processing is accomplished through the addition of an Radar Data Acquisition Subsystem (RDAS) together with radar processing software. The RDAS accepts basic timing and radar video information from a search radar. It provides quantized video hits to the ARTS computer (IOP) in the form of 30 bit words. The computer uses these hits to perform radar target detection land position estimation. (U)

AD-A002 394 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS Timing: Clocks, Synchronization and Restart. (U)

DESCRIPTIVE NOTE: Project rept., DEC 74 16P Kelly,Edward J. ;
REPT. NO. ATC-29
CONTRACT: DOT-FA72WAI-261
MONITOR: FAA-RD 74-142

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Synchronization(Electronics), Time, Clocks, Detectors, Starting, Real time (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The DABS sensor timing subsystem, which consists of two clocks driven from a common station standard, is the subject of this paper. The subsystem configuration is described and the rationale for this design briefly given. Emphasis is on the techniques for synchronization to an external standard, coordination with other sensors and system restart after a failure or deliberate shut-down. (U)

AD-A002 281 17/7 1/2
NAVAL AIR DEVELOPMENT CENTER WARMINSTER PA

Flight Test Evaluation of SECANT VECAS Collision Avoidance System. (U)

DESCRIPTIVE NOTE: Final rept., NOV 74 261P Raditz,Michael ;Shames,Oscar ;Hinds,James ;Finnegan,Patrick ;
REPT. NO. NADC-74207-60
PROJ: A360-0000/001-C/3W34-25-001
MONITOR: GIDEP,GIDEP E050-1415,347.97.00.00-NC-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jun 73, AD-787 032.
DESCRIPTORS: *Collision avoidance, *Aviation safety, *Air traffic control systems, Data transmission systems, L band, Transponders, Altitudes, Avionics, Digital systems (U)
IDENTIFIERS: SECANT(Separation and Control of Aircraft using Nonsynchronous Techniques), Separation and control of aircraft using nonsynchronous techniques, DOT/4IZ/ID (U)

SECANT (Separation and Control of Aircraft using nonsynchronous techniques) is a candidate for a national standard collision avoidance system. The VECAS (Vertical Escape Collision Avoidance System) version was evaluated for ability to communicate accurately and with sufficient distance to provide timely and correct advisories and maneuver commands in simulated high traffic density. (U)

AD-A001 541 17/7
MITRE CORP ATLANTIC CITY N J

Discrete Address Beacon System (DABS)/Air Traffic Control Interface Configuration Document. Volume I. Data Formats for Phase I. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 74 67P Westcott,R. A. ;
REPT. NO. MTR-4243-Vol-1
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-RD 74-165-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, Beacons, Interfaces, Radio links, Transponders, Message processing (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), *Discrete address beacon systems (U)

The document defines the interface data formats to be used for Phase I DABS/Intermittent Positive Control (IPC) testing and Control Message Automation (CMA) testing involving NAFEC facilities and the DABSEF. The formats are a revised version of the formats previously documented in the WP-8858 series which this document supersedes. These formats have been reviewed and accepted in working group meetings involving MITRE, Lincoln Laboratory and FAA. It is intended that this document provide the baseline for data format configuration control. This report is being prepared in three volumes. Volume II describes the DABS/En Route hardware interfaces. Volume III describes the DABS Terminal hardware interfaces. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD-A001 236 17/7
MITRE CORP MCLEAN VA

TCA/ERS Effectiveness Study. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 74 120P Rucker,R. A. ;Simpson,T. R. ;
REPT. NO. MTR-6766
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-15

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control terminal areas, *Air traffic control systems, Aviation safety, Aviation accidents, Radar, Beacons, Transponders, Avoidance (U)

Terminal Control Areas (TCAs) and Expanded Radar Service (ERS) are two means the FAA is employing to reduce the risk of midair collisions in busy airport terminal areas, particularly in that airspace used by IFR turbojet traffic operating to and from the primary airports. The study evaluates the relative importance of insuring that each controller involved with an ATC-served aircraft has reliable position and altitude data on both it and all nearby aircraft, regardless of whether he is serving them or not. It concludes that the TCA approach should be relatively more effective than the ERS approach in preventing midair collisions. The TCA approach should be most efficient in its use of controllers at automated (ARTS III) facilities for a given level of VFR participation if beacon transponders with automatic altitude reporting capability are required. It also concludes that the airport terminal areas now served by ARTS III facilities represent most of the historic midair collision risks to air carrier operations and passengers. (U)

AD-A001 112 17/7
MITRE CORP MCLEAN VA

Multi-Site Intermittent Positive Control Algorithms for the Discrete Address Beacon System. (U)

SEP 74 266P McFarland,A. L. ;
REPT. NO. MTR-6742
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, Control, Algorithms, Radar beacons, Collisions, Avoidance, Computers (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The document presents complete detailed computer algorithms for implementing Intermittent Positive Control (IPC) within a multi-site Discrete Address Beacon System (DABS) network. This document is to be used by the Federal Aviation Administration to specify the IPC system which is to be provided as an integral part of the DABS Phase II system by the DABS System Development Contractor. (U)

AD-A001 039 5/9 1/2
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Aircraft-Pilot and Other Pre-Employment Experience as Factors in the Selection of Air Traffic Controller Trainees, (U)

SEP 74 38P Cobb,Bart B. ;Nelson,Peter L. ;
MONITOR: FAA-AM 74-8

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Traffic Controllers, *Civil Aviation, *Trainees, Selection, Attrition, Performance(Human), Manpower utilization (U)
IDENTIFIERS: *Pilot experience, Age (U)

This longitudinal study of 4,092 ATCS trainees examines the validities of various types of aviation-related experience, separately and in combination, for prediction of success in FAA ATC work--with success defined as retention status within the air traffic control system several years after entry into training. Of the 4,092 subjects, 1,740 entered Academy basic training during September 1960 through August 1963, before an ATC-Aptitude Testing Battery became operational in the screening of most applicants. The remaining 2,352 ATCSs, the majority of whom were selected from among aptitude-screened applicants, entered Academy training during 1969. Both groups entered prior to establishment of the current standard under which eligibility for training is restricted to personnel no older than age 30. (U)

AD-A001 037 17/7 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

DAIR System Radar Target Relationships. (U)

DESCRIPTIVE NOTE: Final rept. May 69-Jan 74,
OCT 74 33P Busch,Allen C. ;Bradbury, Paul W. ;
REPT. NO. FAA-NA-74-4
PROJ: FAA-142-177-010
MONITOR: FAA-RD 74-155

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Airport radar systems, Display systems, Radar targets, Digital systems, Radar, Search radar (U)
IDENTIFIERS: AN/TPX-42A (U)

An analysis was made of the relative accuracy of the digitized radar target symbol position versus the primary radar target. Radar track of one aircraft on radial courses was photographed as displayed in both primary and beacon radar modes, and also as processed through the DAIR system. Quantitative results were statistically analyzed to determine differences between primary radar position and displayed position, and to determine the distribution of the center of the displayed DAIR radar target position about the center of the primary radar target position. Results indicated that the DAIR system tended to display the DAIR center mark at a closer range and at a smaller azimuth angle than the center of the primary radar signal. The altitude of the aircraft did not appear to have any consistent effect on these measurements; however, the range of the aircraft did indicate a tendency to affect the measurements. (U)

AD-A000 671 17/7 9/5
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Improved UHF Multi-Antenna System for Air-Traffic Control Centrals. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 74 29P Campbell,D. V. ;Arnold,J. ;
REPT. NO. ECOM-4269
PROJ: DA-1-T-161102-B-31-A
TASK: 1-T-161102-B-31-A-01

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Antennas, Ultrahigh frequency, Electromagnetic compatibility, Crosstalk, Isolation, Reduction (U)
IDENTIFIERS: AN/TSQ-70A-T1, AN/TSQ-70A (U)

An improved low-cost dual UHF antenna system for air-traffic control was developed which permits simultaneous transmission and reception with little or no crosstalk. Electrical interaction of the antennas is minimized by mounting them collinearly and by incorporating special transmission line decouplers (isolators) to suppress feedline current. Broadband impedance compensators provide satisfactory impedance matching. The reduction in shadowing leads to improved horizontal plane radiation patterns. (Author) (U)

AD-A000 257 17/7 17/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Provisional Message Formats for the DABS/NAS Interface (Revision 1). (U)

DESCRIPTIVE NOTE: Project rept., OCT 74 43P Reiner,D. ;Vandevenne,H. F. ;
REPT. NO. ATC-33-Rev-1
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-63-A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes AD-778 450.
DESCRIPTORS: *Air traffic control systems, *Message processing, Radar beacons, Data links, Signal processing, Surveillance, Interfaces (U)
IDENTIFIERS: National airspace system, NAS(National Airspace System), DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

This document defines formats for messages which are to be transmitted between DABS and NAS facilities (en route or terminal). These messages include one-way Surveillance Reports to NAS and two-way Communications Messages. The latter support data link functions between NAS and DABS-equipped aircraft, as well as aiding in the monitoring and control of DABS sensors. These message formats will be used in the design and construction of interface equipment and ground data links for prototype system test and evaluation at NAFEC during Phase II of the DABS Development Program; and, with modifications resulting from this test and evaluation effort, will form the basis for the operational implementation of DABS. (Author) (U)

AD- 915 484 17/7 9/2
HUGHES AIRCRAFT CO FULLERTON CALIF GROUND SYSTEMS GROUP

Air Traffic Management Automated Center (ATMAC). Concept Formulation Study: Computer Model. Validation Test Plan. (U)

DESCRIPTIVE NOTE: Final rept.
NOV 73 180P
REPT. NO. FR-73-11-1003
CONTRACT: DAAB07-73-C-0043
PROJ: DA-1-X-663723-DB-98
TASK: A-X-663723-DB-9808
MONITOR: ECOM 0043-2-73

UNCLASSIFIED REPORT

DESCRIPTORS: (*Air traffic, Management), (*Air traffic control systems, Flight simulators), (*Computerized simulation, Air traffic), Queueing theory, Interactions, Computer programs, Display systems, Data processing, Data reduction, Data links, Mathematical models, Automation, Validation (U)
IDENTIFIERS: VARIAN 620 computers (U)

This document is being submitted to satisfy the requirements of contract number DAAB07-73-C-0043, CDRL item D001. This validation test plan presents Hughes' approach and plans to develop the interactive simulator, to collect validation data with it, and to apply that data and other validation methods to validate the ATMAC queueing model. (Author) (U)

AD- 910 943 1/5 1/3
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION

Preliminary Study of Marine Aircraft Landing Systems. (U)

DESCRIPTIVE NOTE: Technical rept. no. 1, Apr-Dec 72,
MAY 73 60P Sears,William E. ;Zimmer, R. P. ;Flynt,E. R. ;Ryan,C. E. ;
REPT. NO. GIT-A-1417-TR-1
CONTRACT: N00014-67-A-0159-0011
PROJ: GIT-A-1417

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR LANDING CONTROL, VERTICAL TAKEOFF AIRCRAFT), MOBILE, AIR TRAFFIC CONTROL SYSTEMS, MARINE CORPS, LANDING FIELDS, AIRCRAFT LANDINGS, MULTIPLE OPERATION, MICROWAVES, RADIOFREQUENCY, AUTOMATIC PILOTS, INSTRUMENT LANDINGS, SEARCH RADAR, RADAR SCANNING, RADAR ANTENNAS, RADAR INTERFERENCE, K BAND, X BAND, POLARIZATION, RADAR CROSS SECTIONS, NAVAL AIRCRAFT, JET BOMBERS, JET FIGHTERS, JET TRANSPORT PLANES, TRANSPORT AIRCRAFT, COMMERCIAL PLANES (U)
IDENTIFIERS: AN/SPN-42, AN/TPN-22, A-4 AIRCRAFT, A-4E AIRCRAFT, C-47 AIRCRAFT, F-4 AIRCRAFT, F-4D AIRCRAFT, MARINE REMOTE AREA AND APPROACH LANDING SYSTEM, MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEM, MATCALS(MARINE AIR TRAFFIC CONTROL AND LANDING SYSTE, MRAALS(MARINE REMOTE AREA AND APPROACH LANDI (U)

The requirement of the Navy to develop versatile, rugged, and transportable landing systems suited to Marine Corps Aircraft has created specific problems of a diverse, yet highly technical nature. The problems addressed in this report include those associated with (1) Marine landing systems, including low inertia scanning antennas, and (2) polarization effects on microwave landing systems. This report is intended to give an overview of the above three areas with particular attention devoted to some of the more specific problems. The two landing systems of major interest in this study are the Marine Remote Area and Approach Landing System (MRAALS) and the Marine Air Traffic Control and Landing System (MATCALS). With regard to MATCALS, technical problems concerning the integrity of the scanning beam, (U)

AD- 907 978 17/9 1/3 17/7
HAZELTINE CORP GREENLAWN N Y

Low Cost Air Traffic Control Experiment. (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Jul 71-31 Aug 72,
FEB 73 73P Crush,J. F. ;Muller, W. G. ;
REPT. NO. 6161
CONTRACT: F33615-71-C-1898
PROJ: AF-634B
MONITOR: AFAL TR-72-425

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COSTS), (*RADAR BEACONS, IDENTIFICATION SYSTEMS), TRANSPONDERS, RADAR RECEIVERS, RADAR TRANSMITTERS, NOISE, CODING, MATCHED FILTERS, COMPUTER PROGRAMS, REAL TIME, DATA PROCESSING, AVIATION ACCIDENTS, L BAND, NARROWBAND, ULTRAHIGH FREQUENCY (U)
IDENTIFIERS: *COLLISION AVOIDANCE, INTERROGATION, SIGNAL PROCESSING (U)

This report describes the first phase of an Air Force program to provide for the integration of existing equipments for flight testing and experimental evaluation of a simplified air surveillance tracking and collision avoidance system. The results to be derived from the flight tests are intended to demonstrate the feasibility of a Low Cost Air Traffic Control (LCTC) System for airborne vehicles. The technique used in this basic system for air surveillance is based on time difference principles. The position of each aircraft is determined at the master terminal by measuring the relative time difference of an asynchronous, pseudo-noise coded, short-burst transmission, emitted by the aircraft as received at each of three sites. The coded signals are matched filter processed and relayed to the master terminal where the necessary computations are performed. The coded transmission from each aircraft includes a unique identification code as well as air-derived altitude data. The system equipment includes: spread spectrum, L-Band, down link transmitters/ receivers; (U)

AD- 902 937 20/5 1/3 17/7
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND TECHNOLOGY

Investigation of Hologram Techniques. (U)

DESCRIPTIVE NOTE: Final rept. 1 Feb 70-29 Feb 72,
JUL 72 156P Leith,E. N. ;Upatnieks,J.
;
REPT. NO. 16730-87-F
CONTRACT: F33615-68-C-1310
PROJ: AF-5327, AF-6102
TASK: 532704, 710204
MONITOR: AFAL TR-72-119

UNCLASSIFIED REPORT

DESCRIPTORS: (*LASERS, *STEREOSCOPIC DISPLAY SYSTEMS), (*AIRCRAFT EQUIPMENT, *AIR TRAFFIC CONTROL SYSTEMS), INTERFEROMETERS, COLORS, PHOTOGRAPHIC FILM, BLEACHING AGENTS, MAGNESIUM ALLOYS, BISMUTH ALLOYS, INTERMETALLIC COMPOUNDS, MATERIALS, DATA STORAGE SYSTEMS, ELECTROSTATICS, TRANSDUCERS, PHOTOCHROMISM, IMAGES, QUALITY CONTROL, RECORDING SYSTEMS, AIRCRAFT (U)
IDENTIFIERS: HEAD UP DISPLAY SYSTEMS, *HOLOGRAPHY, HOLOGRAMS (U)

This is the final report on a variety of studies of hologram techniques. A summary of the work during the past six years is presented. Reported second are investigations of three areas of holography applications: three-dimensional light-line sights for aircraft heads-up displays; three-dimensional displays for air traffic control; and holographic information storage and display for aircraft. The feasibility of these applications was investigated, and preliminary experiments were performed. Third is the investigation of magnesium bismuth for its usefulness as an erasable recording material. The results indicate that exposures must be controlled very precisely to retain the erasability of the material. Fourth, the summaries of several research efforts are presented. These efforts include an investigation of the information content of three-dimensional images, a study of three-dimensional projection systems, and a study of the properties and aberrations of holograms. Finally, a list of all publications, reprints of publications, and a list of inventions, all produced during the last two years, (U)

AD- 901 367 17/2 9/2 15/7
IBM FEDERAL SYSTEMS DIV GAITHERSBURG MD

Mission Analysis on Command and Control Communications for Theater Air Operations. System Control for Theater Air Operations. (U)

DESCRIPTIVE NOTE: Contractor rept. no. 5.
JUL 71 327P
CONTRACT: F19628-71-C-0195

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMMAND AND CONTROL SYSTEMS, TACTICAL AIR SUPPORT), (*COMMUNICATIONS CENTRAL, SYSTEMS ENGINEERING), (*MANAGEMENT PLANNING AND CONTROL, COMBAT INFORMATION CENTERS), MISSION PROFILES, PLANNING, AIR CONTROL CENTERS, TACTICAL WARFARE, AIR TRAFFIC CONTROL SYSTEMS, AIR FORCE OPERATIONS, DATA PROCESSING, DATA TRANSMISSION SYSTEMS, TRAFFIC, MANAGEMENT PLANNING AND CONTROL, SCHEDULING, AUTOMATION, INTEGRATED SYSTEMS, NETWORKS, COMMUNICATION EQUIPMENT, SWITCHING CIRCUITS, HIGH FREQUENCY, VERY HIGH FREQUENCY, COMMUNICATION SATELLITES(ACTIVE) (U)
IDENTIFIERS: *COMMUNICATIONS MANAGEMENT, DATA BASES, FILE STRUCTURES, FREQUENCY, MANAGEMENT, JOINT MILITARY ACTIVITIES, MALLARD PROJECT, MESSAGE HANDLING, TACSI(TACTICAL AIR CONTROL SYSTEM IMPROVEMENTS), *TACTICAL COMMUNICATIONS, TACTICAL AIR CONTROL SYSTEM IMPROVEMENTS, TRISERVICE TACTICAL COMMUNICATIONS, TROPOSPHERIC SCATTER COMMUNICATIONS, TRITAC(TRISERVICE TACTICAL COMMUNIC (U)

The communications system required to support theater air operations between 1975 and 1985 will differ, in several fundamental areas, from the current military tactical systems and from those planned for support of the ground forces during this period. These differences present problems in communications system management that can be overcome by adopting new techniques of system engineering and planning, operational system control, and facilities control. These techniques include new ways of establishing a network, controlling its connectivity during the various phases of a military operation, balancing the traffic through the network, and minimizing the outages caused by local equipment failures. (U)

AD- 787 633 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Simulation of the DABS Sensor for Evaluating Reply Processor Performance. (U)

DESCRIPTIVE NOTE: Project rept.,
SEP 74 50P McAulay,R. J. ;Vitto,V.
;
REPT. NO. ATC-28
CONTRACT: DOT-FA72WAI-261, F19628-73-C-0002
PROJ: FAA-034-241-261
MONITOR: FAA-RD 74-123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, Radar beacons, Data links, Interference, Signals, Signal processing, Simulation (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

In order to evaluate the effects of ATCRBS interference on the design of a Discrete Address Beacon System (DABS) sensor, a simulation program was developed. A detailed model of the sensor is presented taht takes into account many of the antenna pattern and signal processing design parameters. A model for the fruit generator is developed so that reply processor performance in typical 1980 high density fruit environments can be evaluated. A particular reply processing algorithm is adopted as a baseline to decode DABS messages and produce a data edited azimuth estimate, so that the desig.1 methodology can be illustrated. Statistics characterizing the reliability of the processor are computed as a function of fruit rate and signalling conditions. The simulation is an invaluable tool for performing sensor/reply processor tradeoff studies. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 787 454 17/7
AIL DEER PARK N Y

Enroute Performance Assurance from User Aircraft Tracks. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 73 220P Lovell,James ;Perz,Franz ;
REPT. NO. AIL-8591-1
CONTRACT: DOT-FA72WA-2710
MONITOR: FAA-RD 73-194

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Navigational aids, Radar beacons, Flight paths, Air traffic, Air traffic control terminal areas, Data acquisition, Computer programs (U)
IDENTIFIERS: *Enroute air traffic control (U)

A method of using the NAS Enroute Stage A equipment to assure enroute navigation facility alignment is described. Frequent and continued updating of the alignment is accomplished by this technique without the use of special aircraft or flights, distraction or conscious participation by pilots, or increase in controller workload. The technique uses a computer to determine the intent of an aircraft to navigate a specific airway and to analyze the distribution of a large number of aircraft as they traverse that airway. If the sample is large enough, the airborne receiver errors will average to zero, and, except for a few cases of habitual diversion, the flight technical error (pilotage) also averages to zero. The final data shows consistency within a few tenths of a degree from one ten day interval to the next. (Modified author abstract) (U)

AD- 787 238 5/10
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Job-Related Attitudes of Non-Journeyman FAA Air Traffic Controllers and Former Controllers: A Sex Comparison, (U)

AUG 74 25P Mathews,John J. ;Collins, William E. ;Cobb,Bart B. ;
PROJ: FAA-AM-B-73-PSY-43, FAA-AM-C-74-PSY-43
MONITOR: FAA-AM 74-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic controllers, *Training, *Attitudes(Psychology), Attrition, Job satisfaction, Males, Females, Statistical data, Questionnaires, Retention(General) (U)
IDENTIFIERS: *Comparative studies (U)

ATC attrition rates have been investigated recently for sex differences in the proportion of trainees completing FAA Academy training; the percentage of women who subsequently left ATC work was twice that of men. In the present comparison, questionnaires concerning aspects of job-related attitudes were given to 56 male and 56 female former trainees (attritions) who were matched on several variables, and also to a sample of controllers (63 women and 63 matched men) who entered training at the same time as the attritions, but who were still in ATC work (Retentions). The results are reported. (U)

AD- 787 231 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Multi-Site Interrogation Scheduling for the Discrete Address Beacon System. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 74 104P Koenke,Edmund J. ;
Tymczyszyn,Joseph P. ;
REPT. NO. FAA-EM-74-14

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Interrogation, Multiple operation, Scheduling, Computer programs, FORTRAN (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

A theoretical analysis and computer simulation were undertaken to develop a DABS/ATCRBS scheduling algorithm which would be capable of servicing the projected 1995 Los Angeles Basin (1608 aircraft aloft). A satisfactory technique was found using sub-epoch timing, partitioning between packed and synchro calls, and time-sharing (a separate interval for each site's synchro calls). The technique also provides garble-free Synchro DABS (air-to-air CAS) service in the multi-site DABS/ATCRBS environment. Time is provided during the packed call interval for extended length messages and target reinterrogation. (Modified author abstract) (U)

AD- 787 032 17/7 1/2
RCA ELECTROMAGNETIC AND AVIATION SYSTEMS DIV VAN NUYS CALIF

SECANT VECAS Flight Test and Evaluation Equipment. (U)

DESCRIPTIVE NOTE: Final rept. 21 Jul 72-31 May 73, JUN 73 126P Case,B. ;Browder,J. ;Hall, J. ;
REPT. NO. TP2133
CONTRACT: N62269-73-C-0052

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Aviation safety, *Air traffic control systems, Transponders, Altitude, Coding, L band, Data transmission systems, Avionics, Digital systems (U)
IDENTIFIERS: *Collision avoidance, SECANT(Separation and Control of Aircraft using Nonsynchronous Techniques), Separation and control of aircraft using nonsynchronous techniques (U)

The development undertaken was the interface circuits and equipment to permit the information in the SECANT System to be recorded in digital form for automatic processing. Two VECAS Systems were fabricated, assembled, and tested. Two sets of special test equipment consisting of a Calibration Generator and a Traffic Simulator were fabricated, assembled, and tested. (U)

AD- 785 335 17/7
MCDONNELL DOUGLAS ELECTRONICS CO ST CHARLES MO

Synchronization Station Location Study - Tradeoff Phase. (U)

DESCRIPTIVE NOTE: Final rept. Nov 73-May 74 on Phase 3, MAY 74 75P Holt,J. M. ;Watson,F. D. ;
CONTRACT: DOT-FA73WA-3172
PROJ: FAA-052-241-026
MONITOR: FAA-RD 74-117

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-779 538.
DESCRIPTORS: *Air traffic control systems, *Synchronism, Ground stations, Site selection, Trade off analyses, Collision avoidance, Time (U)

Techniques were developed and applied in making trade-off evaluations of the overall synchronization effectiveness of various levels of airborne vs ground-based hierarchal time relaying equippage. It is shown that the number of ground-based master stations required to supply a desired level of synchronization coverage to all aircraft (hierarchal and non-hierarchal), increases rapidly as the number of hierarchal aircraft is diminished. Trade-off studies were made of the master station site selection algorithms. It was shown that the priority algorithm is very near optimum. However, choices of alternate sets of sites (such as air traffic hubs) can be used to obtain operational or economic advantages with only slight reduction in overall effectiveness. Analytic and computational processes developed in Phases I and II were extended to evaluate the effects of atypical operations: master station outages, reduction in hierarchal support due to airline outage and weather. In all cases, hierarchal interconnection provided a high degree of redundancy and the overall system exhibited little loss in effectiveness under abnormal conditions. NTSB records of aircraft collisions indicated that a high level of coverage could be supplied by five master stations complemented by larger aircarrier equipped with hierarchal equipment. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 785 334 17/7 1/5
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: Airport Capacity Analysis, (U)

SEP 73 62P Iyer,R. R. ;Goldman,D. ;
REPT. NO. MTR-6419-Ser-6
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10A-Ser-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 5, AD-785 311 and Series 7, AD-785 312.
DESCRIPTORS: *Air traffic control systems, *Airports, Runways, Mathematical models, Aviation safety, Approach, Instrument flight, Forecasting, Experimental design, Aircraft, Statistical processes (U)
IDENTIFIERS: Advanced air traffic management system, Third generation systems, Instrument flight rules, Fourth generation systems, Runway capacity (U)

The report gives the analysis of IFR runway capacity constraints for twenty nine primary high density airports. These airports were examined during the course of the Advanced Air Traffic Management System B study. The mathematical model used to determine IFR runway capacity takes into account the runway configuration, approach control delivery precision, aircraft performance characteristics, aircraft safety separation standards, runway occupancy rule, departure/arrival spacing and departure/departure spacing. The analysis shows that thirteen of the twenty nine airports will be capacity limited in 1995. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 785 313 17/7 5/1
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: System Cost Analysis, (U)

SEP 73 65P Sinha,A. N. ;
REPT. NO. MTR-6419-Ser-8
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10A-Ser-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 7, AD-785 312.
DESCRIPTORS: *Air traffic control systems, *Cost analysis, *Management planning and control, Estimates, Surveillance, Communication and radio systems, Navigation, Systems engineering, Radar equipment, Voice communications, Research management, Management information systems (U)
IDENTIFIERS: Advanced air traffic management system, Third generation systems, Fourth generation systems, Long range planning (U)

The AATMS study was initiated to evaluate various concepts of fourth generation air traffic control in the 1995 era. The purpose was to aid in the long-range planning of research and development, and to identify areas that appear the most promising for early preparation for the fourth generation. The report discusses the system cost analysis of an extension of the upgraded third generation ATC system. Cost estimates are presented for the surveillance, communications, and navigation subsystems as well as for the control centers and controller staffing. (U)

AD- 785 312 17/7
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: ATC Automation Analysis, (U)

FEB 74 65P Sinha,A. N. ;
REPT. NO. MTR-6419-Ser-7
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10A-Ser-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 6, AD-785 334 and Series 8, AD-785 313.
DESCRIPTORS: *Air Traffic control systems, *Automation, *Forecasting, Computer applications, Requirements, Cost analysis, Estimates, Mathematical models (U)
IDENTIFIERS: *Advanced air traffic management system, Third generation systems, Fourth generation systems, Control centers (U)

The AATMS study was initiated in an effort to evaluate various concepts of fourth generation air traffic control in the 1995 era. This report discusses the ATC automation requirements of the control center configurations of an upgraded third generation ATC system. Computer sizing estimates are presented for all the control centers in the System B 1995 configuration. Cost estimates, in current dollars, for the computer systems, based on existing technology, are also presented. (U)

AD- 785 311 17/7 5/1
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: Discrete Address Beacon System (DABS) Accuracy and Coverage Requirements, (U)

FEB 74 64P Gupta,V. ;Haines,A. ;
REPT. NO. MTR-6419-Ser-5
CONTRACT: DOT-FA70WA-2248
MONITOR: FAA-EM 73-10A-Ser-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 4, Vol 2, AD-785 310 and Series 6, AD-785 334.
DESCRIPTORS: *Air traffic control systems, *Radio beacons, *Systems engineering, Configurations, United States, Instrument flight, Space(Room), Standards, Mathematical prediction, Navigation (U)
IDENTIFIERS: Advanced air traffic management system, New York to Chicago corridor, Third generation systems, *Los Angeles(California), Los Angeles(California), Instrument flight rules, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The report develops the DABS system configuration for the Advanced Air Traffic Management System (AATMS), System B, and evaluates the coverage provided by the resulting 291 DABS sites. More than 90% of the CONUS is found to be covered down to 3,000' AGL under a four-thirds earth assumption. The report also develops the IFR spacing standards and the navigation and surveillance requirements sufficient for AATMS, System B, to handle the projected 1995 nominal demand load. Two worst cases have been chosen, the New York to Chicago corridor for the en route case, and the Los Angeles Basin for the terminal case. (U)

AD- 785 310 17/7 5/1
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: 1995 Los Angeles Basin Traffic Model, Volume II, (U)

MAR 74 127P Mundra,A. D. ;
REPT. NO. MTR-6419-Ser-4-Vol-2
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10-A-Ser-4-vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 4, Vol 1, AD-785 309 and Series 5, AD-785 311.
DESCRIPTORS: *Air Traffic control systems, *Forecasting, Scheduling, Regions, Arrival, Space(Room), Classification, Operation, Airports, California (U)
IDENTIFIERS: Third generation systems, Arrival departure matrices, *Traffic models, Flight categories, *Los Angeles(California) (U)

The volume contains the complete set of arrival/ departure matrices and its supporting data, used for the generation of the snapshot of Los Angeles 1995 airspace (Appendix B). This snapshot is listed in its entirety (Appendix C). Also included are summary statistics on the snapshot in the form of density maps of the basin by altitude bands and detailed altitude and speed statistics for important flight categories (Appendix D). (U)

AD- 785 309 17/7 5/1
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: 1995 Los Angeles Basin Traffic Model, Volume I, (U)

MAR 74 94P Mundra,A. D. ;
REPT. NO. MTR-6419-Ser-4-Vol-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10A-Ser-4-vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 3, AD-785 308 and Series 4, Vol 2, AD-785 310.
DESCRIPTORS: *Air traffic control systems, *Management engineering, *Forecasting, Mathematical models, California, Operation, Airports, Load distribution, Peak values, Management information systems, Economics, Classification, Factor analysis, Velocity, Altitude, Statistical data (U)
IDENTIFIERS: *Third generation systems, *Los Angeles(California) (U)

A model of air traffic in the Los Angeles basin for the 1995 time frame is developed in this document. Details of annual operations demand projections for the basin including a distribution of loads over airports are provided. This demand is then translated into a typical peak instant traffic picture (snapshot of the airspace) and estimates of the busy hub hour loads for airports. The snapshot is summarized for various characteristics such as user type, flight type, altitude distributions and speed distributions. (U)

AD- 785 308 17/7 5/1
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: Air Traffic Activity Projections for 1995. (U)

MAR 74 89P Goldman,D. ;
REPT. NO. MTR-6419-Ser-3
CONTRACT: DOT-FA70WA-2443
MONITOR: FAA-EM 73-10A-Ser-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 2, AD-785 264 and Series 4, Vol 1, AD-785 309.
DESCRIPTORS: *Air traffic control systems, *Management planning and control, *Forecasting, Mathematical prediction, Aircraft carriers, Operation, Airports, Military aircraft, Statistical processes, Estimates, Factor analysis, Economics, Management information systems (U)
IDENTIFIERS: Third generation systems, Advanced air traffic management system (U)

The report describes a set of projected 1995 air traffic activity data for use in evaluation of advanced air traffic management system concepts. Included in the projections are the aircraft fleets and operations rates for the air carrier, general aviation and military markets. Airport activity rates are estimated on an annual basis and instantaneous airborne counts are developed for a 'typical' peak period. (U)

AD- 785 264 17/7
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System. System B: General Requirements Specification. (U)

DESCRIPTIVE NOTE: Rept. for Aug 72-Jun 73,
FEB 74 184P Harris,R. M. ;Goldman,D. ;
Gupta,V. P. ;Haines,A. L. ;Iyer,R. R. ;

REPT. NO. MTR-6419-Ser-2
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10-A-Ser-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 1, AD-785 023, and Series 3, AD-785 308.
DESCRIPTORS: *Air traffic control systems, Specifications, Systems analysis, Requirements, Air traffic (U)

The document is a preliminary outline for conducting a study of competing air traffic control systems for the 1990 era. The ground rules for comparing two system approaches are given with an emphasis on maintaining common assumptions with respect to air traffic demand, airport development, controller workload, automation levels, and the system elements already in place in 1982. The preliminary nature of the document is emphasized as a number of modifications were found to be necessary during the conduct of the study. (Author) (U)

AD- 785 023 17/7
MITRE CORP MCLEAN VA

An Advanced Air Traffic Management Concept Based on Extensions of the Upgraded Third Generation ATC System: Summary Report. (U)

DESCRIPTIVE NOTE: AATMS study series no. 1 (Final) Aug 72-Jun 73,
MAR 74 245P Harris,R. M. ;Elrod,B. D. ;Fee,J. J. ;Goldman,D. ;Gupta,V. P. ;

REPT. NO. MTR-6419-Rev-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-10-A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Series 2, AD-785 264.
DESCRIPTORS: *Air traffic control systems, *Management planning and control, Ground controlled approach radar, Air traffic, Terminal flight facilities, Collision avoidance, Navigation satellites, Cost analysis (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The Advanced Air Traffic Management System (AATMS' study was initiated by the Department of Transportation in an effort to evaluate various air traffic control concepts in the 1995 era. The purpose was to aid in the long-range planning of engineering and development, and to identify areas that appear the most promising for early initiation. The system proposed in this study to handle the traffic and provide the services required in 1995 is composed of extensions of the Upgraded Third Generation ATC System. This report summarizes the findings and recommendations of the MITRE/OSEM study. This study examined techniques and costs for alternative ways of building upon the 1982 Baseline ATC System. (Modified author abstract) (U)

AD- 784 860 17/7
TEXTRON INC BUFFALO N Y BELL AEROSPACE DIV

Multilateration/Multipath Study for Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. 27 Apr-31 Dec 73,
JUL 74 158P Sullivan,Neil ;Ames,Ray W. ;
REPT. NO. 6364-933005
CONTRACT: F30602-73-C-0283
MONITOR: RADC TR-74-173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Distance measuring equipment, Multipath transmission, Landing aids, Radar beacons, Errors, Models, Computerized simulation, Computer programs (U)
IDENTIFIERS: Trilateration (U)

A report is made on a study and simulation program to define a feasible multilateration position measuring system for aircraft final approach and landing. Error models are given for a pulse type distance measuring equipment (DME) operating in a realistic multipath environment. A pulse by pulse simulation of the interrogation and reply process from successive aircraft positions to three or more ground beacons gives fine grain detail of the data 'noise'. A simplified representation of the aircraft's response to command enables the final approach guidance loop to be closed for various geometrical arrangements of the ground beacons. System performance requirements are specified, a preferred ground beacon layout is defined and simulation results are illustrated. A flight test program is recommended to verify equipment performance and a flight evaluation plan is detailed. (Author) (U)

AD- 784 380 17/7 17/2.1
COMPUTER SCIENCES CORP FALLS CHURCH VA

Access Control and Processing Studies for Ground-Satellite Mobile Communications/ Surveillance Systems. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Dec 73, JUN 74 174P Bisaga,John J. ;Blank, Howard A. ;Brown,Alan J. ;
CONTRACT: DOT-TSC-565
MONITOR: FAA-RD,TSC 74-106,FAA-74-18

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: *Air traffic control systems, *Satellite communications, Systems analysis, Satellite networks, Access, Control systems, Avionics (U)

The report synthesizes a set of satellite communications systems configurations to provide services to aircraft flying oceanic routes. These configurations are combined with access control methods to form complete systems. These systems are analyzed using a simulation and their performance is presented in terms of avionics complexity and cost, queuing delays, pilot workload, and operational considerations. A preferred system is selected and recommendations are made. (Author) (U)

AD- 784 340 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Radiofrequency Interference/Electromagnetic Interference Measurements: New York Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Test rept. (Final), AUG 74 206P Stone,Margaretta V. ;
REPT. NO. FAA-NA-74-156
MONITOR: FAA-RD 74-110

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared by AEL Service Corp., Farmingdale, N.J.
DESCRIPTORS: *Air traffic control systems, *Electromagnetic interference, Radiofrequency interference, New York, Measurement, Automati (U)
IDENTIFIERS: Air route traffic control (U)

The report describes electromagnetic interference tests at the New York Air Route Traffic Control Center (ARTCC), Islip, Long Island, New York. The tests included measurement of radiated and conducted emission from both the automated system and non-automated equipments, and radiated and conducted susceptibility of the automated system. Conducted and radiated electric and magnetic field emission from most of the automated system equipments exceeded the limits of MIL-STD-461A, but was not sufficiently high to adversely affect other equipment certified to MIL-STD-461A. Most of the automated system equipments met the susceptibility limits of MIL-STD-461A. Exceptions were the Plan View Display and Input/Output Control Element. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 784 082 17/7
ARMY AVIATION CENTER FORT RUCKER ALA

Study of Air Traffic Management Systems for the Short-Range (1974-1978) and Mid-Range (1979-1986) Time Frames. Volume II. (U)

DESCRIPTIVE NOTE: Final rept.
MAY 74 118P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-784 081.
DESCRIPTORS: *Air traffic control systems, *Management information systems, *Army aircraft, *Time domain, Management planning and control, Short range(Time), Automation, Requirements, Assessment, Threat evaluation, Policies (U)
IDENTIFIERS: Mid range(Time), Recommendations, *Air traffic management systems (U)

The ATMS Study was conducted for the purpose of recommending an air traffic management system for the short- and mid-range time frames and of reassessing the degree of automation required for such a system during the mid-range time frame. Nine candidate systems were evaluated. Findings and conclusions were based on user requirements and doctrine, current Army airspace management policies, the high air defense threat, and the changing aviation tactics required to cope with this threat. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 784 081 17/7
ARMY AVIATION CENTER FORT RUCKER ALA

Study of Air Traffic Management Systems for the Short-Range (1974-1978) and Mid-Range (1979-1986) Time Frames. Executive Summary. Volume I. (U)

MAY 74 16P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-784 082.
DESCRIPTORS: *Air traffic control systems, *Management information systems, *Time domain, Management planning and control, Short range(Time), Transitions, Surveys, Automation, Requirements, Army aircraft (U)
IDENTIFIERS: Mid range(Time), Recommendations (U)

The purpose of the study was to recommend appropriate conceptual air traffic management systems for the short-range (1974-1978) and mid-range (1979-1986) time frames, including the transition period. Study objectives were to reassess the degree o automation required in light of the high air defense threat environment, changing doctrine and tactics, and budgetary constraints; and to develop the necessary information on which the USATRADOC user community can base a position with respect to further Air Traffic Management Automated Center (ATMAC) development. (U)

AD- 783 751 17/7 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Graphic Study of a Selected Site for a Second Major Airport in the Atlanta, Georgia, Terminal Area. (U)

DESCRIPTIVE NOTE: Final rept. Jun-Jul 74,
AUG 74 32P Maurer,John ;McCosker,W. Robert ;Willett,Francis ;
REPT. NO. FAA-NA-74-33
PROJ: FAA-013-150-010
MONITOR: FAA-RD 74-133

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, Airports, Site selection, Georgia, Utilization, Air traffic, Urban areas (U)
IDENTIFIERS: Atlanta(Georgia), Traffic engineering (U)

A graphic simulation study of the Atlanta air traffic control terminal area was requested by the Southern Region to assist in developing a feasible plan for airspace use and air traffic control operations in the Atlanta metropolitan area, assuming the establishment of a second major airport. The second major airport was assumed to be located in the Paulding/Polk County area of Georgia, approximately 15 nautical miles west of Dobbins Air Force Base/Naval Air Station Atlanta, Marietta, Georgia. The study considered instrument operations to all instrument flight rule airports within the Atlanta terminal area. The primary runway configuration considered at the new airport was a northwest/southeast alignment of four parallel runways with two additional parallel north/south runways. The present major airport, William B. Hartsfield Atlanta International Airport, was considered to have four parallel east/west runways. Three other runway alignments for the new airport, a west/northwest and southwest were also studied. (Modified author abstract) (U)

AD- 783 652 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase II. Terminal Design and Flight Test Plan for Phase I Program. Volume 2. Flight Test Plan. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 69-1 Jun 70.
APR 73 57P
REPT. NO. D6-60178-2
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-II-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 583 and AD-783 584.
DESCRIPTORS: *Air traffic control systems, *Radio links, *Surveillance, *Multipath transmission, Voice communications, Satellites(Artificial), Aircraft, Digital systems, L band, Flight testing (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

Flight test requirements was defined and integrated flight test schedules have been prepared for the voice/data communications, surveillance, and multipath propagation experiments defined in the phase I test plan. A 6-month flight test program is assumed. Aircraft flightpaths and maneuvers, measurement station locations, satellite usage, and test procedures are given for each experiment. From these, integrated test schedules for the KC-135, DC-6B, and ATS-5 satellite are prepared. Due to failure of the ATS-5 satellite to achieve proper stabilization in orbit, the flight test requirements and schedules described herein were extensively revised prior to the phase IV flight test program. (Author) (U)

AD- 783 633 17/7 17/2.1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Investigation of Radiofrequency Interference to the Backup Emergency Communication Equipment at the Elwood, New Jersey, Long-Range Radar Site. (U)

DESCRIPTIVE NOTE: Final rept. Mar 73-Jan 74,
JUL 74 36P Apostolakis,George ;Moss, Arthur ;
REPT. NO. FAA-A-74-13
PROJ: FAA-121-101-110
MONITOR: FAA-RD 74-115

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication equipment, *Radiofrequency interference, Digitizers, Search radar, Antennas, Electromagnetic shielding, Transmitter-receivers, Field intensity, Very high frequency, Ultrahigh frequency, Electromagnetic compatibility (U)
IDENTIFIERS: ARSR-2 radar (U)

The purpose of this study was to investigate radiofrequency interference (RFI) to the backup emergency communication (BUEC) equipment at operational long-range radar sites (LRRS). The investigative effort consisted of determining the sources of RFI, the frequency and intensity of RFI at various locations within the LRRS, and the BUEC frequencies affected by the RFI. Various methods of eliminating or reducing the effects of this RFI were studied. This report discusses the methodology and results of these RFI studies. (U)

AD- 783 632 17/7 4/2
NAVAL AMMUNITION DEPOT CRANE IND

Slant Visual Range (SVR)/Approach Light Contact Height (ALCH) Management System: Evaluation in Fog. (U)

DESCRIPTIVE NOTE: Final rept. on Phase 2.
JUL 74 134P
MONITOR: FAA-RD 74-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated Jan 74, AD-777 307.
DESCRIPTORS: *Air traffic control systems, *Slant range, Visibility, Fog, Meteorological instruments, Measurement (U)
IDENTIFIERS: *Slant visual range, Approach light contact height, Transmissometers (U)

Systems with potential for predicting SVR/ALCH were tested at the National Aviation Facilities Experimental Center (NAFEC), Federal Aviation Administration, Department of Transportation, Atlantic City, New Jersey. These systems' estimation of the slant path transmittance were compared to data being generated by NBS transmissometers located at several levels on nearby 160-foot towers. The transmittance values predicted by the systems being evaluated were used to compute RVR and SVR data. The results of these computations were compared to the actual RVR-SVR calculated based upon NBS transmissometer measurement. The report contains data on the stratification of the fogs observed at NAFEC during the test duration. Pilot eye response is considered with emphasis on techniques of determining the pilot's adaptational level. The pilot's adaptation level calculation is combined with (1) the extinction rate measurements, (2) pilot's eye response and (3) the geometry of the scenario in order to form ALCH and SVR algorithms. (Author) (U)

AD- 783 619 17/7 17/9
STANFORD RESEARCH INST MENLO PARK CALIF

Diode Beacon Techniques. (U)

DESCRIPTIVE NOTE: Final rept. 31 May 72-30 Sep 73,
JUN 74 144P Gorwara,Ashok E. ;
CONTRACT: F30602-72-C-0444
PROJ: AF-5556, SRI-1970
TASK: 555605
MONITOR: RADC TR-74-147

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Transponders, Radar equipment, Airport radar systems, Microwave equipment, Solid state electronics, IMPATT diodes, Microwave oscillators, Target detection, Radar clutter, Multipath transmission, Signal processing, Ku band (U)

In recent years, there has been a great interest in physically small, low-cost, low-energy-consuming electronic markers for tagging materials and vehicles, for air traffic control on the ground, and for surveillance or tracking of personnel over a limited area. The purpose of the study was to investigate the state of the art in low-cost beacon components that will provide a target-like signal for a maximum range of five miles in various weather conditions when they are illuminated by search, tracking, or surface-detection radars. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 783 588 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase V. Multipath/Ranging Analysis and Results. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun-30 Sep 72.
APR 73 243P
REPT. NO. D6-60181
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-V

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 587.
DESCRIPTORS: *Air traffic control systems, *Multipath transmission, *Range finding, L band, Radio links, Surveillance, Aircraft, Satellites(Artificial) (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

Experimental results are presented for 30 multipath and ranging test flights involving an FAA KC-135 jet airplane, the NASA ATS-5 satellite, the NASA/Rosman ground station, and the FAA NAFEC facility. Tests included overocean multipath measurements and one-way tone ranging between the ground station and airplane via the satellite. Data were acquired over the North Atlantic at satellite elevation angles between 9 degrees and 31 degrees, within the 1545 to 1655 MHz frequency band allocated for future aeronautical satellite services. Significant multipath experiment results include determination of the multipath signal amplitude statistics, power spectral density, polarization properties, and selective fading characteristics. Multipath results are correlated with theoretical predictions based on use of the physical optics scatter model. Ranging experiment results include performance confirmation of a narrow-band cw tone ranging technique, characterization of the effect of multipath on ranging accuracy, and concept demonstration using low-gain slot dipole aircraft antennas. Comparison of experimental ranging results with theoretical predictions is given. (Author) (U)

AD- 783 587 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase IVD. Additional Tests. Volume 2. Overland Multipath, Pacific Multipath, Scintillation Tests. (U)

DESCRIPTIVE NOTE: Final rept. 28 Jun 72-28 Jul 73. APR 73 100P
REPT. NO. D6-60186-2
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-IVD-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 586 and AD-783 588.
DESCRIPTORS. *Air traffic control systems, *Multipath transmission, Scintillation, L band, Satellites(Artificial), Radio links (U)
IDENTIFIERS: ATS-5 satellite (U)

Experimental results at L-band are presented for eight overland multipath flights, six overocean multipath flights in the Pacific region, and a series of fixed-link scintillation measurements within the 1595- to 1655-MHz frequency band allocated for future aeronautical satellite services. Test signals were transmitted from the NASA/Rosman ground station to an FAA KC-135 jet airplane via the NASA ATS-5 satellite. Overland multipath data were acquired at elevation angles between 14 degrees and 19 degrees over marshy, hilly, and mountainous terrain in northern Canada and Alaska for both summer and winter conditions. These data together with the Pacific region overocean multipath data were analyzed to determine scatter reflection coefficients, circular polarization sense reversal characteristics, and power spectral density. Scintillation test data were analyzed to determine signal time histories, amplitude histograms, S2 scintillation parameter, statistical fade depths, and power spectra. (Author) (U)

AD- 783 586 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase IVD, Additional Tests. Volume 1. Satellite/Aircraft L-Band Data Communication Tests. (U)

DESCRIPTIVE NOTE: Final rept. 28 Jun 72-28 Jul 73. APR 73 133P
REPT. NO. D6-60186-1
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-IVD-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 585 and AD-783 587.
DESCRIPTORS: *Air traffic control systems, *Radio links, Data transmission systems, Digital systems, Data links, L band, Satellites(Artificial), Errors, Phase shift circuits, Multipath transmission (U)
IDENTIFIERS: Phase shift keying, ATS-5 satellite (U)

A digital data transmission experiment conducted between the NASA/Rosman ground station and an FAA KC-135 jet airplane at L-band via the geostationary NASA ATS-5 satellite is described. Sixteen tests were conducted during March and April 1973. All tests employed PSK transmission of alphanumeric text and pseudonoise sequences over the link to obtain a quantitative comparative evaluation of CPSK, DECPSK, and DPSK detection techniques. Significant results included performance characterization of the detection techniques for both the AWGN channel and the Rician fading channel in the presence of overocean multipath. Reception of messages using slot dipole antennas on the aircraft was also successfully demonstrated. Results are presented and discussed relative to theoretical expectation. (Author) (U)

AD- 783 585 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase IV, Flight Test Procedures and Flight Test Summary. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 71-1 Jun 72.
APR 73 77P
REPT. NO. D6-60180
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-IV

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 584 and AD-783 586.
DESCRIPTORS: *Air traffic control systems, *Flight testing, Radio links, Range finding, Multipath transmission, Digital systems, Satellites(Artificial), Aircraft, L band, Surveillance (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

The flight test phase of the multipath/ranging/digital data L-band experimental program is described. Special instrumentation, installation design, and initial terminal checkout procedures are discussed. Flight testing began in April 1971 using the satellite L-L NBFT mode but was reconfigured for the CXL mode following failure of the satellite L-band receiver. The link configuration changes and hardware modifications required are described. The remaining 27 flights were conducted between August 1971 and May 1972 using the modified link and the CXL satellite mode. The flight test organization, flight test geometries, detailed test plans, NASA support requirements, and typical operations schedules for the various tests are given. A summary tabulation of the data flights and a discussion of the in-flight system calibration procedures is included. (Author) (U)

AD- 783 584 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase III. Definition of Revised Experiment, Terminal Design, and Subsystem Performance Characteristics. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 70-1 Mar 71.
APR 73 113P
REPT. NO. D6-60179
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-III

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 583 and AD-783 585.
DESCRIPTORS: *Air traffic control systems, *Multipath transmission, *Range finding, Radio links, Attenuation, L band, Antennas, Satellites(Artificial), Communication terminals, Radio equipment, Digital systems, Surveillance, *Aircraft, Aircraft antennas* (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

A revised overocean multipath propagation and cw tone-ranging flight test experiment specifically designed to accommodate the ATS-5 spin is described. The test program will employ the 1540- to 1660-MHz frequency band and will involve an FAA KC-135 jet airplane, the spinning NASA ATS-5 satellite, and a ground station at the FAA NAFEC facility. Four experimental L-band antennas are designed for installation on the KC-135: a steerable quad helix, a crossed-dipole multipath array, and two low-grain slot dipoles. The ground station and airborne terminal hardware are defined. Detailed measured performance data are given for the antennas and major equipment subsystems. The field test program and analysis of the data acquired are accomplished under phases IV and V of the contract. (Author) (U)

AD- 783 583 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase II. Terminal Design and Flight Test Plan for Phase I Program. Volume 1. Terminal Design. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 69-1 Jun 70.
APR 73 112P
REPT. NO. D6-60178-1
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-II-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 582 and AD-783 584.
DESCRIPTORS: *Air traffic control systems, *Communication terminals, Radio links, Specifications, Range finding, Satellites(Artificial), Radio equipment, Antennas, Aircraft, Surveillance, Digital systems, Data transmission systems, Data links, L band, Flight testing (U)
IDENTIFIERS: Tone ranging, ATS-5 satellites (U)

Airborne and ground station terminal designs for implementation of the phase I test plan are defined. Hardware configurations for the KC-135, DC-6B, and the NAFEC and Mojave ground terminals are described. Preliminary subsystem performance specifications, intended to form the basis for either in-house development or outside procurement, are given. Due to failure of the ATS-5 satellite to achieve proper stabilization in orbit, extensive program revisions occurred prior to the phase IV flight test program. Only a few of the hardware items described herein were actually procured or fabricated, and the overall terminals were not implemented. (Author) (U)

AD- 783 582 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program. Phase I. Experimental Program - Aircraft Communications/Surveillance Via Satellite at L-Band. (U)

DESCRIPTIVE NOTE: Final rept. 23 Apr 69-1 Jun 70.
APR 73 405P
REPT. NO. D6-60177
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57-I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 581 and AD-783 583.
DESCRIPTORS: *Air traffic control systems, *Radio links, *Multipath transmission, *Surveillance, Digital systems, Voice communications, Antennas, Range finding, L band, Data links, Data transmission systems, Aircraft, Satellites(Artificial), Data reduction (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

A program definition study (phase I) for an experimental flight test program intended to establish the capabilities and limitations of an L-band aeronautical satellite system has been completed. Three experiments are defined: aircraft position surveillance via satellite, voice and digital communications via satellite, and multipath propagation characterization. The test program was designed to use the NASA ATS-5 satellite, scheduled for launch in August 1969, and two FAA airplanes, a KC-135 and a DC-6B. Ground terminals were to be located at the NASA Mojave facility in California and at the FAA NAFEC facility near Atlantic City, N.J. Descriptions of the aircraft experimental L-band antennas and functional requirements for the airborne and ground-based terminals are given. Due to failure of the ATS-5 satellite to achieve proper stabilization in orbit, the test program and hardware described herein were extensively revised prior to implementation and flight test as described in subsequent program phases. (Author) (U)

AD- 783 581 17/7
BOEING COMMERCIAL AIRPLANE CO SEATTLE WASH

ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program - Program Summary. (U)

DESCRIPTIVE NOTE: Final rept. Apr 69-Jul 73.
APR 73 153P
REPT. NO. D6-60176
CONTRACT: DOT-FA69WA-2109
MONITOR: FAA-RD 73-57

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-783 582.
DESCRIPTORS: *Air traffic control systems, *Radio links, *Range finding, *Multipath transmission, Digital systems, Satellites(Artificial), Data transmission systems, Scintillation, Data reduction, L band, Surveillance, Aircraft, Data links (U)
IDENTIFIERS: Tone ranging, ATS-5 satellite (U)

A summary description of an L-band multipath/ranging/diital communication experimental program is given. Tests involved an FAA KC-135 jet airplane, the NASA ATS-5 satellite, the NASA/Rosman ground station, and the FAA NAFEC facility. All tests were conducted within the 1545- to 1655-MHz frequency band allocated for future aeronautical services. Tests included 30 overocean multipath and ranging flights in the North Atlantic region, 16 digital data communication tests, eight overland multipath flights including both summer and winter conditions, six overocean multipath flights in the Pacific region, and nine fixed-link scintillation tests. Summary test results are presented and discussed relative to theoretical expectation. (Author) (U)

AD- 782 860 17/7 9/5
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Microwave Scanning Beam Approach and Landing System Phased Array Antenna. (U)

DESCRIPTIVE NOTE: Annual rept. no. 3, Jul 72-Mar 73,
MAY 74 174P Kalafus,R. M. ;Bishop,G. J. ;LaRussa,F. J. ;Pantano,P. J. ;Spangler,D. ;
REPT. NO. TSC-FAA-74-9
MONITOR: FAA-RD 74-59

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Feb 73, AD-759 097.
DESCRIPTORS: *Air traffic control systems, *Landing aids, *Microwave antennas, Phased arrays, Microwave equipment, Beam steering, C band, Digital computers, Computer programming (U)
IDENTIFIERS: NTISDOT, *Microwave landing systems, *Azimuth scanning antennas, Beam steering computers (U)

The design, operating instructions, detailed logic circuitry, and antenna test range results for the electronic circular scanning phased array developed at TSC (DOTSCAN) are described. Components developed for this effort are also described, and test results given. (Author) (U)

AD- 782 256 17/7
BELL AEROSPACE CO BUFFALO N Y

System Access Control Study. (U)

DESCRIPTIVE NOTE: Final rept. Jan 73-Jan 74,
JUN 74 317P Shub,L. ;Allen,D. ;Clune,
E. ;Lerner,T. ;
CONTRACT: DOT-TSC-539
PROJ: FA-411
MONITOR: TSC-FAA,FAA-RD 74-16,74-107

UNCLASSIFIED REPORT

DESCRIPTORS: *Navigation satellites, *Air traffic control systems, *Multiple access, Avionics, Multiplexing, Data links, Communication satellites, Instrumentation, Computer programming (U)
IDENTIFIERS: FDMA(Frequency Division Multiple Access), Frequency division multiple access, TDMA(Time Division Multiple Access), Aerosat satellites, Time division multiple access, Channel management (U)

The report presents a summary of a study conducted for the Transportation Systems Center of promising access control techniques which are applicable to an aeronautical satellite system. Several frequency division multiple access (FDMA) and time division multiple access (TDMA) configurations are analyzed and compared which are capable of providing voice, data and independent surveillance services. One of the FDMA concepts and a burst TDMA system are rated highest and are presented in greatest detail. Procedures are outlined for different types of entry, beam switching and handling various types of interconnections. Included are preliminary designs of the avionics instrumentation. (Author) (U)

AD- 781 387 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

The 1973 Los Angeles Air Route Traffic Control Center's Air Traffic Model. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 74 110P Willett,Francis M. , Jr;
REPT. NO. FAA-NA-74-11
PROJ: FAA-013-601-C40
MONITOR: FAA-RD 74-42

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-767 075.
DESCRIPTORS: *Air traffic control systems, *Air traffic, Models, Surveys, California, Standards, Instrument flight (U)

The purpose of the traffic sample model was to develop a standard to test future air traffic systems and equipment. A model was constructed of a three-dimensional aircraft movement operating in the Los Angeles Air Route Traffic Control Center's (ARTCC) area. The model contained Instrument Flight Rule flight operational data which occurred on March 14, 1973, under the control of the Los Angeles ARTCC during a three-hour period. An air traffic model was developed consisting of 619 operations generated by 512 aircraft flights. This model is representative of the operations of a high-density domestic center. Also included are data analyses of the operation of airports and aircraft in the model. (Modified author abstract) Portions of this document are not fully legible. (U)

AD- 781 358 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

SRDS Technical Program Document, Fiscal Year 1975 Engineering and Development Programs. (U)

JUL 74 166P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 73, AD-771 208.
DESCRIPTORS: *Air traffic control systems, *Air transportation, *Civil aviation, Systems engineering, Radar, Radar beacons, Navigation, Aircraft, Communication and radio systems, Landing aids, Approach, Aviation safety, Weather, Airports, Research management, Planning (U)

The document contains research and technology Resumes which reflect Systems Research and Development Service, Federal Aviation Administration, approved subprograms. These resumes identify the technical objective, approach, milestones scheduled for accomplishment, accomplishments, requirements, etc. The document is structured according to 21 engineering and development programs. (U)

AD- 780 959 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Distance Measuring Equipment Traffic-Loading Capacity Investigation. (U)

DESCRIPTIVE NOTE: Final rept. Jul-Oct 73,
JUN 74 96P Postel,Harold ;
REPT. NO. FAA-NA-73-105
PROJ: FAA-042-308-000
MONITOR: FAA-RD 74-93

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Distance measuring equipment, Interrogator transmitters, Radio beacons, Air traffic, Predictions, Counting methods (U)

The report covers findings of the distance measuring equipment (DME) traffic counts from selected facilities. The data are to provide a basis for estimating present and future DME traffic-handling capabilities. DME traffic counts were conducted at the following facilities: Miami, Florida; Atlanta, Georgia; Robbinsville, New Jersey; Gardner, Massachusetts; Long Beach, California; Los Angeles, California; Oakland, California; Nottingham, Maryland; and Modena, Pennsylvania. The Miami, Florida, VORTAC showed the greatest amount of DME traffic; approaching 56% of capacity during peak periods. (Author) (U)

AD- 780 803 17/7
META SYSTEMS INC SANTA CLARA CALIF

Progress Report Verification in an Automated Oceanic Air Traffic Control System. (U)

DESCRIPTIVE NOTE: Final rept. Mar 72-May 73, MAY 73 46P Giallanza,Frank V. ; Giallanza,Charles P. ;Brown,James C. ;
CONTRACT: DOT-FA72WA-2851
MONITOR: FAA-RD 73-70

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Automation, Oceans, Computer programming, Algorithms (U)

An algorithm was developed to verify the content of progress reports input to an automated oceanic air traffic control system. The reporting position, reporting time, flight level, next reporting fix and the pilot's estimated time of arrival at the next reporting fix is checked for consistency with the pilot's filed flight plan. (Author) (U)

AD- 780 558 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

A Sex Comparison of Reasons for Attrition of Non-Journeyman FAA Air Traffic Controllers, (U)

MAR 74 17P Matthews,John J. ;Collins, William E. ;Cobb,Bart B. ;
PROJ: FAA-AM-B-73-PSY-43, FAA-AM-C-74-PSY-43
MONITOR: FAA-AM 74-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Attrition, Employment, Personnel selection, Job satisfaction, Retention(General), Job training (U)
IDENTIFIERS: Sex discrimination(Employment) (U)

Recent ATC attrition rates showed no sex differences in the proportion of trainees who completed FAA Academy training; however, the percentage of females who subsequently left ATC work was over twice that of male trainees. In the present study, the 56 females who entered the Academy between December 1968 and November 1970, and who were no longer with the FAA as of June 1972, were matched on several variables with male attritions who had entered the Academy at the same time. Reasons for attrition were obtained from job-exit forms, telephone interviews, and a questionnaire. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 780 381 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Provisional Message Formats and Protocols for the DABS 1PC/PWI Display. (U)

DESCRIPTIVE NOTE: Project rept., MAY 74 26P Robeck,P. H. ;Welch,J. D. ;
REPT. NO. ATC-35
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-83

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Message processing, Data links, Display systems, Cockpits (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The document specifies provisional formats for the data link portion of the 'signals-in-space' which are part of the DABS interrogations and replies. Also included is a discussion of the characteristics that these signals assume while transmitted from the transponder proper to the instrument which delivers the messages to the pilot. Specifically, formats, algorithms, and protocols are assigned to serve the IPC (Intermittent Positive Control), PWI (Proximity Warning Indicator), and ATC (numerical indicator) functions. The protocol and algorithm for the pilot acknowledgment link is also included in this paper. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 780 159 17/7 9/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Provisional Message Formats and Protocols for the DABS 32-Character Alphanumeric Display. (U)

DESCRIPTIVE NOTE: Project rept., MAY 74 13P Welch,J. D. ;Colby,G. V. ;
REPT. NO. ATC-36
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-84

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Display systems, Data links, Radar beacons, Message processing (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, Alphanumeric displays (U)

Formats and protocols are described for tactical ATC displays to be driven by the Standard Message interface of a DABS transponder and capable of handling a succession of data transmissions, each of which is individually acknowledged via a transponder reply before the transmission of the succeeding segment. Specific codes are defined for a display device of up to 32 alphanumeric characters. Any displays defined or implied by this document are intended solely for use in the DABS test and evaluation program, and are not necessarily representative of recommended or required display devices for an operational DABS system. (Author) (U)

AD- 779 746 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Radiofrequency Interference/Electromagnetic Interference Measurements. Oakland Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final test rept., MAY 74 220P Stone,Margaretta V. ;
REPT. NO. FAA-NA-74-150
CONTRACT: DOT-FA72NA-728
MONITOR: FAA-RD 74-28

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Electromagnetic interference, Radiofrequency interference, California, Automation, Electromagnetic compatibility (U)
IDENTIFIERS: Oakland(California) (U)

The report describes electromagnetic interference tests at the Oakland Air Route Traffic Control Center (ARTCC), Oakland, California. The tests included measurement of radiated and conducted emission from both the automated system and non-automated equipments, and radiated and conducted susceptibility of the automated system. Conducted and radiated electric and magnetic field emission from most of the automated system equipments exceeded the limits of MIL-STD-461A, but was not sufficiently high to adversely affect other equipment certified to MIL-STD-461A. Most of the automated system equipments met the susceptibility limits of MIL-STD-461A. Exceptions were the Plan View Display, Common Logic Unit, Tape Drive, M1 display and System Control Console. (Modified author abstract) (U)

AD- 779 538 17/7
MCDONNELL DOUGLAS ELECTRONICS CO ST CHARLES MO

Synchronization Station Location Study, Calibration Study Phase. (U)

DESCRIPTIVE NOTE: Final rept. May-Oct 73 on Phase 2, OCT 73 150P Holt,J. M. ;Watson,F. D. ;Neumann,C. J. ;
CONTRACT: DOT-FA73WA-3172
PROJ: FAA-052-241-026
MONITOR: FAA-RD 73-173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jul 73, AD-768 677.
DESCRIPTORS: *Time signals, *Air traffic control systems, Air traffic, Simulation, Management, Synchronism, Ground stations, Site selection, Trade off analyses, Aviation safety (U)
IDENTIFIERS: Collision avoidance (U)

The purpose of this contract is to determine siteing criteria and installation priority for deployment of ground stations that provide precision time service to NAS. The study contract is being performed in three overlapping stages; methodology development, calibration, and trade-off analyses. The calibration phase reported here validates critical and sensitive aspects of the methodology and provides the basis for selecting and executing particular trade-off analyses. Several non-hierarchal aircraft population models and several measures of system effectiveness was investigated. The conclusion is reached that a set of master station sites can be selected which obtain very high levels of all examined effectiveness measures when servicing any foreseeable population of non-hierarchal aircraft. (U)

AD- 779 537 17/7
META SYSTEMS INC SANTA CLARA CALIF

Remote Entry of Progress Reports in an Automated Oceanic Air Traffic Control System. (U)

DESCRIPTIVE NOTE: Final rept. Mar 72-Dec 72, DEC 73 44P Giallanza,Frank V. ; Giallanza,Charles P. ;Brown,James C. ;
CONTRACT: DOT-FA72WA-2851
MONITOR: FAA-RD 73-71

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Oceans, Automation, Data links, Digital systems, Message processing, Input (U)

The requirements and procedures to input voice-derived progress from a remote source into an automated oceanic air traffic control system are described. The message formats and procedures to communicate with Aeronautical Radio, Inc. (ARINC) are described in detail. The description is supplemented with functional flowcharts which illustrate the process. (Author) (U)

AD- 779 495 17/7 9/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Survey of National Airspace System En Route Related Support and Data Reduction and Analysis Programs. (U)

DESCRIPTIVE NOTE: Final rept. Jun 73-Jan 74, MAR 74 240P Ellison,Gary ;Egloff,Jim ;
MONITOR: FAA-RD 74-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Data reduction, Computer programs, Control sequences (U)
IDENTIFIERS: National Airspace system, IBM 9020 computers (U)

The Survey of National Airspace System Related Support and Data Reduction and Analysis Programs provides a list of IBM 9020 computer programs which were developed to aid in the development, test, maintenance and enhancement of the NAS En Route Air Traffic Control Computer System. The survey provides the reader with a description of all Data Reduction Programs, their input and output, lists of the supporting documentation and the areas of the program's usage. These areas of program usage include: Surveillance System Test, Common Digitizer Testing, NAS System Test, Incident Analysis, System Performance Analysis, and Statistical Counts and Summaries of ARTCC operations. (Author) (U)

AD- 779 086 17/7 17/2.1
IIT RESEARCH INST ANNAPOLIS MD

An Automated FAA Frequency Assignment System, (U)

DEC 73 95P Beall,L. ;Crisafulli,R. ; Morrow,J. ;Vangaasbeck,S. ;
CONTRACT: F19628-73-C-0031, DOT-FA70WAI-175
PROJ: AF-649E
MONITOR: ECAC,FAA-RD PR-73-049,73-184

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Frequency allocation, Very high frequency, Communication and radio systems, Automation, Frequency, Management, Electromagnetic interference, Matrices(Mathematics), Computer programs (U)

An automated frequency assignment system is developed as a means of providing frequency assignment plans for FAA Air Traffic Control (ATC) VHF communications facilities in the continental United States. The system is implemented by means of a series of computer programs (described herein) designated collectively as the Frequency Assignment System (FAS). FAA-supplied ATC data is used to build an intersite channel-separation matrix which serves as input to the assignment process. Assignment techniques are developed that make maximum use of the available spectrum. Descriptions are included on how the frequency manager can vary the program inputs to investigate the advantages of different assignment procedures. (Author) (U)

AD- 778 951 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Simulator Evaluation of Pilot Assurance Derived from an Airborne Traffic Situation Display. Phase II. Traffic Awareness Improvement. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 72-30 Jun 73 on Phase 2,
JUL 73 241P Melanson,David ;
CONTRACT: DOT-FA71WAI-234
MONITOR: FAA-EM 74-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-749 280.
DESCRIPTORS: *Air traffic control systems, *Display systems, *Terminal flight facilities, *Performance(Human), Airborne, Simulation, Test methods, Reaction time, Air traffic, Human factors engineering, Space(Room), Communication and radio systems, Plan position indicators, Test methods, Runways (U)
IDENTIFIERS: Aircraft conflict detection, *Traffic awareness, Pilot assurance, *Collision avoidance, Evaluation, *Airborne traffic situation displays (U)

The research program described evaluated the pilot assurance derived from an Airborne Traffic Situation Display (ATSD), assurance being defined in terms of the pilot's awareness of his traffic environment. Forty-four professional pilots participated in a number of simulation experiments designed to measure pilot awareness using party line voice communications and a possible future system employing the ATSD. Tests were run with and without an in-trail spacing task and with one and two-man flight crews. A pilot's ability to detect and react to conflict situations was measured during both single and parallel runway operations. The effects of conflict alarms and the frequency of updating information were also examined. All experiments were conducted in a fixed-based simulator configured as a Boeing 707. (U)

AD- 778 935 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Automated Reliability Assessment Program. (U)

DESCRIPTIVE NOTE: Final rept. Sep 72-Sep 73, APR 74 36P Wojciechowicz,John J. ;
REPT. NO. FAA-NA-73-85
PROJ: FAA-121-101-070
MONITOR: FAA-RD 74-16

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Reliability, Assessment, Automation, Failure, Maintenance, Computer programs, FORTRAN (U)
IDENTIFIERS: FORTRAN 4 programming language (U)

An Automated Reliability Assessment Program (ARAP) was developed for evaluation of Federal Aviation Administration (FAA) equipments and systems. The ARAP is a set of procedures and computer programs used to reduce and analyze failure/maintenance data. In addition to reliability parameter estimation, related failure/maintenance characteristics are analyzed including failure modes, maintenance manhours, part replacement/failure rates, and part disposition. The ARAP has been in operation over the past two years and significant benefits in terms of assessment quality, manpower cost, and completion time, have been derived. It is recommended in the report that the ARAP be used to support reliability/maintainability activities at the National Aviation Facilities Experimental Center (NAFEC) and be considered for FAA-wide implementation. (Author) (U)

AD- 778 817 17/7
META SYSTEMS INC SANTA CLARA CALIF

Flight Plan Position Extrapolation in an Automated Oceanic Air Traffic Control System. (U)

DESCRIPTIVE NOTE: Final rept. Mar 72-May 73, MAY 73 55P Giallanza,Frank V. ; Giallanza,Charles P. ;Brown,James C. ;
CONTRACT: DOT-FA72WA-2851
MONITOR: FAA-RD 73-72

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Flight paths, Automatic, Trigonometry, Ground speed, Extrapolation, Equations, Computer programming, Wind, Range(Distance), Position(Location), Time (U)
IDENTIFIERS: *Great circle air routes (U)

A method was developed to extrapolate the position of an aircraft along its flight plan route based on information contained in a stored flight plan and current meteorological data. The method assumes great circle flying. (Author) (U)

AD- 778 816 17/7 17/2
COMPUTER SCIENCES CORP FALLS CHURCH VA

An Initial Concept for the FAA Integrated Communications Systems. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Dec 73,
DEC 73 78P Hansen,John C. ;
REPT. NO. CSC-4186-3
CONTRACT: DOT-FA72WA-3072
MONITOR: FAA-RD 73-132

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Integrated systems, Communications networks (U)
IDENTIFIERS: National airspace system, NAS(National Airspace System) (U)

The report describes a concept for an integrated communications system in support of FAA National Airspace System Operations in the Upgraded Third Generation time period. The concept is developed by consideration of communication requirements and a set of design guidelines. (Author) (U)

AD- 778 479 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

National Airspace System Enroute Stage A System Engineering and Analysis, Investigation of System Problems, Capacity Testing. (U)

DESCRIPTIVE NOTE: Final rept. Aug 72-Oct 73,
APR 74 27P Morgan,Harry T. , Jr;
REPT. NO. FAA-NA-73-109
PROJ: FAA-121-101-100
MONITOR: FAA-RD 74-51

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, Systems engineering, Radar, Computerized simulation, Engineering (U)
IDENTIFIERS: *National airspace system (U)

A series of special engineering tests was designed to determine what, if any, capacity limitations would occur when NAS 3d1 was operated under steadily increasing traffic load. The tests were performed at the National Aviation Facility Experimental Center (NAFEC) employing the Digital Simulation Facility and the System Support Facility. Both the Display Channel Complex and the Computer Display Channel modes of operation were investigated. NAS 3d1 successfully met capacity test criteria. This report describes these tests and the results obtained. (Author) (U)

AD- 778 390 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Impact of Satellite Aeronautical Channel on Modem Specifications. (U)

DESCRIPTIVE NOTE: Final rept. Aug 72-Mar 73 on Phase I,
MAR 74 299P Bello,Phillip A. ;Boardman, Charles J. ;Chase,David ;DeRosa,Joseph K. ;

REPT. NO. TSC-FAA-74-1
CONTRACT: DOT-TSC-516
MONITOR: FAA-RD 74-54

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared by CNR, Inc., Newton Upper Falls, Mass.
DESCRIPTORS: *Air traffic control systems, *Modems, Multipath transmission, Satellite communications, L band, Avionics, Performance(Engineering), Trade off analyses (U)

The report analyzes the effects of surface-scattered multipath on the performance of ranging and data modems such as might be used on the aircraft-satellite channel of an air-traffic control system. An exact analysis is carried out on the effects of noise and multipath on the one-way ranging errors of a single-sideband tone ranging modem. These results are shown to be applicable at high SNR and direct path/multipath ratios to a double-sideband tone ranging modem whose sideband separation equals the tone separation in the single sideband system. The conventional practice of calculating ambiguity error probabilities with an assumption of Gaussian ranging error distribution is shown to be inapplicable for many situations of practical interest. (Modified author abstract) (U)

AD- 778 387 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Provisional Signal Formats for the Discrete Address Beacon System (Revision 1). (U)

DESCRIPTIVE NOTE: Project rept.,
APR 74 57P Drouilhet,P. R. ;
REPT. NO. ATC-30-rev-1
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-021
MONITOR: FAA-RD 74-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated 9 Nov 73, AD-770 052.
DESCRIPTORS: *Air traffic control systems, Data links, Radar beacons, Radar signals (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRES(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The document specifies provisional DABS signal, i.e., the characteristics of the 'signals-in-space' which form the DABS interrogations and replies. Also included is a discussion of the utilization of the described formats to effect the surveillance and data link communication functions for which DABS has been designed. These signal formats will be used in the design and construction of engineering development model transponders and interrogators for prototype system test and evaluation at NAFEC during Phase II of the DABS Development Program; and, with modifications resulting from this test and evaluation effort, will form the basis for the operational implementation of DABS. (Author) (U)

AD- 778 214 5/10 6/19 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Physiological, Biochemical, and Psychological Responses in Air Traffic Control Personnel: Comparison of the 5-Day and 2-2-1 Shift Rotation Patterns. (U)

DEC 73 19P Melton,C. E. ;McKenzie, J. M. ;Smith,R. C. ;Polis,B. D. ;Higgins, E. A. ;
REPT. NO. FAA-AM-73-22
PROJ: FAA-AM-B-72-PHY-55.

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Stress(Physiology), *Stress(Psychology), Psychological tests, Performance(Human), Response(Biology), Aviation personnel, Work, Cycles, Rest, Biochemistry, Fatigue(Biology) (U)

Stress in controllers on the straight five-day shift was determined at Houston Intercontinental Tower in 1970. In 1971 controllers on the 2-2-1 rotation were studied at the same tower. Controllers generally prefer the 2-2-1 to the straight five-day schedule because of the long week end associated with the 2-2-1. Management is concerned that the 'quick turnaround' on the 2-2-1 is a stressor that could compromise job performance. Physiological and psychological assessments showed no significant stress differences on the two schedules. On neither of the schedules did the controllers' stress levels differ from the general polulation. It was concluded that the stress differences on the two rotation patterns were too slight to be of real significance and a choice between them would have to rest on managerial considerations rather than biomedical ones. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 778 144 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Provisional Data Link Interface Standard for the DABS Transponder. (U)

DESCRIPTIVE NOTE: Project rept., APR 74 23P Colby,G. V. ;Robeck,P. H. ;Welch,J. D. ;
REPT. NO. ATC-34
CONTRACT: DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-64

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Discrete Address Beacon System.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, *Transponders, Data links, Interfaces, Standards (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The document specifies provisional data link interface standards for the DABS transponder. It describes the function, timing, and electrical properties of the signals flowing to and from both the Standard Message Interface and the Extended Length Message Interface. (Author) (U)

AD- 778 136 17/7
MITRE CORP MCLEAN VA

Study of Alternative Beacon Based Surveillance and Data Link Systems. Volume II. (U)

DESCRIPTIVE NOTE: Final rept., APR 74 400P Jones,S. R. ;Gibbons,R. C. ;Manders,A. M. ;Spencer,N. A. ; Ylvisaker,I. B. ;
REPT. NO. MTR-6517-Vol-2
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-7-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-776 676.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, Data links, Surveillance, Digital systems, Cost analysis (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

Several beacon-based surveillance systems--both addressed and non-addressed--as well as several data link systems, in appropriate combinations, were analyzed with respect to meeting the future requirements of the Upgraded Third Generation ATC System. These requirements included surveillance characteristics suitable for automatic ground-based collision avoidance (IPC); they also included data mated company digital communication services. The Discrete Address Beacon System (DABS) is shown to be the lowest cost of all alternatives for implementing IPC for the basic general aviation user. (Modified author abstract) (U)

AD- 778 028 5/1
XYZYX INFORMATION CORP CANOGA PARK CALIF XYTRAIN DIV

Development of an Analysis and Evaluation Methodology for Command and Control. (U)

DESCRIPTIVE NOTE: Technical rept., MAR 74 107P Finley,Dorothy L. ;Muckler, Frederick A. ;Gainer,Charles A. ;Roe,William T. ;
REPT. NO. TR-1
CONTRACT: N00014-73-C-0095
PROJ: RF018-96, NR-364-090

UNCLASSIFIED REPORT

DESCRIPTORS: *Aircraft carriers, *Command and control systems, *Air traffic control systems, Reviews, Management information systems, Methodology, Systems engineering, Personnel management, Management training, Naval research, Data management, Flight, Operation, Models, Performance(Human) (U)
IDENTIFIERS: Recommendations, Concepts (U)

The report documents progress in development of a methodology to assist analysts in obtaining better status, predictive, and diagnostic information regarding Navy Command and Control (C and C) through use of available data resources and systems personnel knowledge. As the underlying concern is the operating effectiveness and performance of manned systems, much of the methodological logic and concepts under development are fundamental to manned systems problems in general. First year results include recommendations stemming from the study and observation of fleet operations. These concern carrier air traffic control center personnel selection and evaluation, equipments and crew station design, carrier air traffic control policy, and officer management training. (Modified author abstract) (U)

AD- 777 914 1/5 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Analysis of Dual Lane Runways. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 74 61P Ball,Carl T. ;
REPT. NO. FAA-RD-73-97
PROJ: FAA-082-421-214

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Terminal flight facilities, *Runways, Aircraft landings, Takeoff, Taxiways, Scheduling, Mathematical models (U)
IDENTIFIERS: *Dual lane runways (U)

An interservice ad hoc Dual Lane Runway (DLRW) Committee was established in January 1971 to develop, evaluate and demonstrate dual lane runway design criteria, modes of operation and site selection criteria. In support of this effort, data was collected on dual lane runway operations at Cleveland Hopkins, Boston Logan, Los Angeles International, and Atlanta Hartsfield International Airports. The Lincoln Laboratory of MIT was employed to conduct real time (man-in-the-loop) and fast time (canned program) computer simulations of dual lane runway configurations and operation strategies. The bulk of their work dealt with using one runway for arrivals only and one runway for departures only. The dual lane analysis was extended by the Airport Design Branch of the Systems Research and Development Service (SRDS) to include modes of operation where both runways were used for arrivals and one or more runways for departures. A model predicting potential missed approaches was used for this effort. (Modified author abstract) (U)

AD- 777 838 6/19
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Physiological Responses in Air Traffic Control Personnel: Houston Intercontinental Tower, (U)

DEC 73 22P Melton,C. E. ;McKenzie, J. M. ;Polis,B. David ;Hoffman,Marlene ; Saldivar,J. T. , Jr;
MONITOR: FAA-AM 73-21

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Naval Air Development Center, Warminster, Pa.
DESCRIPTORS: *Stress(Physiology), *Air traffic controllers, Aviation personnel, Operators(Personnel), Biochemistry, Adaptation(Physiology), Epinephrine, Catecholamines (U)
IDENTIFIERS: Norepinephrine (U)

Biochemical and physiological indices of stress showed that the level of stress of 16 air traffic controllers at the Houston Intercontinental Airport Tower was indistinguishable from that of control populations. While the level of stress was lower than that among O'Hare Tower controllers, both groups showed about the same degree of adaptation. Day work (heavy traffic load) at Houston was characterized by elevated levels of all stress indicators as compared with the mid-shift (light traffic); epinephrine excretion increased significantly during the last half of the mid-shift as compared with the first half. Urinary stress indicators (17-ketogenic steroids, epinephrine, norepinephrine) were all significantly elevated during day sleep as compared with night sleep, indicating less effective rest during day sleep. (Modified author abstract) (U)

AD- 777 565 5/10
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION MEDICINE

Susceptibility to Anxiety and Shift Difficulty as Determinants of State Anxiety in Air Traffic Controllers. (U)

DEC 73 6P Smith,Roger C. ;Melton,C. E. , Jr;
REPT. NO. FAA-AM-73-15

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic controllers, *Anxiety, Stress(Psychology), Job analysis, Performance(Human), Test methods, Assessmen (U)

The State-Trait Anxiety Inventory (STAI) was used to assess the anxiety of air traffic controllers who had experienced difficult and easy work shifts. Eighty volunteers completed the STAI before and after two or more eight-hour work shifts. Controllers relatively high in anxiety proneness tended to report higher levels of anxiety in association with control work than those relatively low in anxiety proneness. The mean A-state score after shifts was higher than the mean score before shifts. It was also determined that the increase in anxiety during shifts was greater for difficult shifts. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 777 269 4/2 17/7
META SYSTEMS INC SANTA CLARA CALIF

The Acquisition and Use of Meteorological Data in an Automated Oceanic Air Traffic Control System. (U)

DESCRIPTIVE NOTE: Final rept. Mar 72-May 73,
DEC 73 55P Giallanza,Frank V. ;
Giallanza,Charles P. ;Brown,James C. ;
CONTRACT: DOT FA72WA-2851
MONITOR: FAA-RD 73-142

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Meteorological data, Data acquisition, Interpolation, Extrapolation (U)

The sources from which meteorological data can be acquired and how the data can be used in an automated oceanic air traffic control system are discussed. A proposed data base for meteorological data is defined. Interpolation and extrapolation methods, and a process by which the data base can be updated are described. (Author) (U)

AD- 777 241 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Models of Multipath Propagation Effects in a Ground-to-Air Surveillance System. (U)

DESCRIPTIVE NOTE: Technical note,
FEB 74 157P McGarty,T. P. ;
REPT. NO. TN-1974-7
CONTRACT: DOT-FA-72-WAI-261, F19628-73-C-0002
PROJ: FAA-034-241-012
MONITOR: ESD TR-74-40

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Surveillance, Multipath transmission, Surface to air, Antennas, Signal processing, Models (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

Models are developed for the electromagnetic propagation of diffuse and specular multipath for a surface-to-air ATC radar beacon link. The models take into account geometrical, topographical, electrical, and surface characteristics of the multipath propagation environment. The models are used to evaluate signal fading and azimuth estimation performance of a monopulse processor in a ground-based interrogator. The results are applied to assessing the performance of the DABS sensor. Conclusions and recommendations for experimental work are presented. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 777 174 1/2 17/7
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Automation of the Landing Control of Aircraft, (U)

MAR 74 517P Belogorodskii,S. L. ;
REPT. NO. FTD-MT-24-720-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono. Avtomatizatsiya Upravleniya Posadkoi Samoleta, n.p., 1972 p1-351, by Francis T. Russell.
DESCRIPTORS: *Aircraft landings, *Automatic pilots, *Air traffic control systems, Approach, Radio altimeters, Landing aids, Aerodynamic loading, Landing forces, Radio beacons, Air control centers, Aviation safety, Passenger aircraft, Translations, USSR (U)

Questions on the automation of one of the most complex stages of flight -- the landing of the aircraft -- are examined. The operating principles of the radio technical devices utilized for formation of landing trajectories are illuminated. Questions of the dynamics of semiautomatic and automatic aircraft control are presented and block diagrams and features of domestic and foreign systems of automated landing control of aircraft are examined. (U)

AD- 776 961 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Radiofrequency Interference/Electromagnetic Interference Measurements Los Angeles Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final test rept. Aug 72-Jun 73,
MAR 74 274P Stone,Margaretta V. ;
REPT. NO. FAA-NA-73-92
CONTRACT: DOT-FA72NA-728
MONITOR: FAA-RD 74-11

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Electromagnetic interference, Radiofrequency interference, Automation, Measurement, Californ (U)

The report describes electromagnetic interference tests at the Los Angeles Air Route Traffic Control Center (ARTCC), Palmdale, California. Measurements included radiated and conducted emission from the automated system and nonautomated equipments, and radiated and conducted susceptibility of the automated system. (Modified author abstract) (U)

AD- 776 914 9/5 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Summary of Results of Antenna Design Cost Studies, (U)

FEB 74 81P Sureau,J. C. ;
REPT. NO. ATC-22
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-20

UNCLASSIFIED REPORT

DESCRIPTORS: *Radar antennas, *Air traffic control systems, Radar beacons, Cost analysis, Cost effectiveness (U)
IDENTIFIERS: Design, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The Discrete Address Beacon System (DABS) will provide the primary Air Traffic Control (ATC) surveillance information for the 1980-1990 time period as it is introduced gradually as a replacement for the present Air Traffic Control Radar Beacon System (ATCRBS). This report discusses and summarizes the results of two DABS antenna system design-cost trade off studies performed by industrial concerns with substantial design, fabrication and field maintenance experience related to similar antenna systems now in the field. The data from these studies, was to be used to support other Lincoln Laboratory DABS studies leading to the definition and specification of a cost-effective system design. (U)

AD- 776 798 17/7 17/9
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

False Target Elimination at Albuquerque Using ARTS-III Software. (U)

DESCRIPTIVE NOTE: Technical note, MAR 74 30P Cameron,Alan G. ;
REPT. NO. TN-1974-12
CONTRACT: F19628-73-C-0002
PROJ: AF-649L
MONITOR: ESD TR-74-134

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar reflections, *False targets, Algorithms, Corrections, New Mexico (U)
IDENTIFIERS: Albuquerque International Airport, Kirtland Air Force Base, Albuquerque(New Mexico), ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, ARTS(Automated Radar Terminal Systems), Automated radar terminal systems, ARTS 3(Automated Radar Terminal Systems 3), Automated radar terminal system 3 (U)

Lincoln Laboratory has been assisting the U.S. Air Force Weapons Laboratory in the study of ATCRBS false targets caused by reflections from buildings at Albuquerque International Airport/Kirtland AFB. This paper discusses the false target situation there and proposes two algorithms for correcting it in ARTS-III software. The simpler of the two appears applicable to the Albuquerque situation today, and is easily extendable to correct false targets caused by new buildings. Since the process appears directly applicable to many FAA Secondary Radar installations, a more complex algorithm is also presented, which is suitable for use in very high density terminal areas. (Author) (U)

AD- 776 699 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Effects of Airborne Transponder Antenna Lobe Switching on En Route (PCD) and Terminal (BDAS) Beacon Reply Processing. (U)

DESCRIPTIVE NOTE: Final rept. on Task C, JAN 74 184P Day,Ernest H. ;Pannell, James H. ;
REPT. NO. ATC-18
CONTRACT: DOT-FA72WAI-242
PROJ: FAA-022-243-012, FAA-033-241-062
MONITOR: FAA-RD 73-109

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on ATC Surveillance/ Communication Analysis and Planning.
DESCRIPTORS: *Air traffic control systems, *Aircraft antennas, Transponders, Radar beacons, Tracking, Beacons, Switching, Antenna lobes, Military aircraft (U)
IDENTIFIERS: ATCRBS(Air Control Radar Beacon Systems), Air traffic control radar beacon systems, ARTS 3(Automated Radar Terminal System 3), Automated radar terminal system 3 (U)

The comparative performances of switching top and bottom transponder antennas versus the bottom antenna alone, in target detection by ARTS III and by PCD, were investigated in order to determine which of the two antenna configurations is preferable. A variety of military aircraft participated, performing climbouts, orbits, straight and level segments, and descents, in order to expose a wide range of aspect angles to the interrogator. The frequency of occurrence of lost targets, particularly of consecutive lost targets, was found to vary considerably from one aircraft type to another. Analysis of the reduced data provides a reasonable basis, however, for concluding that, to maximize average probability of detection, the bottom antenna is better in the terminal area but switching antennas are better for En Route application. (Modified author abstract) (U)

AD- 776 682 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

An Overview of the FAA Engineering and Development Programs with Highlights of Fiscal Years 1974-1975. (U)

MAR 74 88P
REPT. NO. FAA-EM-74-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 73, AD-758 284.
DESCRIPTORS: *Air traffic control systems, *Systems analysis, *Aviation safety, *Airports, Planning, Forecasting, Reports, Management, Facilities, Finance (U)

A report is made on the Federal Aviation Administration's developmental program for air traffic control and safety, indicating long term directions, highlighting 1974 achievements to date, and discussing the expected progress and accomplishments for 1975. It includes systems evolution, upgraded third generation control, airport characteristics, general aviation considerations, program descriptions, and management. (U)

AD- 776 676 17/7
MITRE CORP MCLEAN VA

Study of Alternative Beacon Based Surveillance and Data Link Systems. (U)

DESCRIPTIVE NOTE: Final rept., MAR 74 41P Jones,S. R. ;Gibbons,R. C. ;Manders,A. M. ;Spencer,N. A. ;Ylvisaker,I. B. ;
REPT. NO. MTR-6517-Vol-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-7-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Data links, Surveillance, Cost analysis, Digital systems (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

Several beacon-based surveillance systems--both addressed and non-addressed--as well as several data link systems, in appropriate combinations, were analyzed with respect to meeting the future requirements of the Upgraded Third Generation ATC System. These requirements included surveillance characteristics suitable for automatic ground-based collision avoidance (IPC); they also included data link characteristics suitable for delivering all ATC and IPC services and estimated company digital communication services. The Discrete Address Beacon System (DABS) is shown to be the lowest cost of all alternatives for implementing IPC for the basic general aviation user. (Author) (U)

AD- 776 141 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

The Effects of ATCRBS P sub 2 Pulses on DABS Reliability. (U)

DESCRIPTIVE NOTE: Project rept., JAN 74 68P Harman,W. H. ;Shnidman,D. A. ;
REPT. NO. ATC-20
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Discrete Address Beacon System (DABS).
DESCRIPTORS: *Air traffic control systems, *Radar beacons, Data links, Transmitting, Reliability, Electromagnetic interference, Pulse amplitude modulation, Phase modulation (U)
IDENTIFIERS: Differential phase shift keying, DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

An analytical study was performed to determine the effects of ATCRBS P sub 2 pulses as interference to DABS uplink transmissions. These effects constitute a major component of all uplink error-producing mechanisms that are anticipated to occur in DABS operation. The study is formulated in a way that includes effects of both receiver noise P sub 2 pulse interference, where the interference can be received from any of a number of different transmitters at different distances from the receiving aircraft. The model includes the randomness associated with whether or not a particular DABS signal is overlapped by any interference pulse, and also the conditional randomness of error production given that an overlap does occur. In fact, a major portion of the study is the determination of the conditional error probability given the occurrence of an overlap with stated signal-to-interference ratio and stated signal-to-noise ratio. (Modified author abstract) (U)

AD- 776 140 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Summary of the DABS (Discrete Address Beacon System) Transponder Design/Cost Studies. (U)

DESCRIPTIVE NOTE: Project rept., MAR 74 44P Goblick,T. J. ;Robeck,P. H. ;
REPT. NO. ATC-27
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
MONITOR: FAA-RD 74-17

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Transponders, Radar beacons, Cost analysis, Costs, Avionics (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

One of the major concerns in the DABS development program has been the cost of the DABS transponder. In order to realistically assess the impact on transponder cost of the many alternative techniques and design choices being considered for DABS, four study contracts were awarded to avionics manufacturers to design and estimate costs of special circuitry (in Phase I) and complete transponders (in Phase II). The report summarizes the major results of these design/cost studies, which cover general aviation, military, and air carrier transponder designs (including a retrofit kit for the military APX-72 transponder). The transponder design/cost studies have had a marked influence on the design of the DABS signal and message formats. Since the cost studies were basically intended for comparing link options for DABS, the transponder specifications used in these cost studies do not correspond in detail to current DABS transponder specifications. Therefore the cost data contained in this report cannot be taken to be completely representative of the cost of the finally specified DABS transponders. (Author) (U)

AD- 775 306 17/7 17/9
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

Angel Clutter and the ASR Air Traffic Control Radar. Volume II. Appendices. (U)

DESCRIPTIVE NOTE: Final rept. Oct 71 Feb 73,
FEB 73 256P Barry,J. R. ;Carter,B. K. ;Erdahl,R. J. ;Harris,R. L. ;Miller,J. T. ;
REPT. NO. APL-MSO-F-195-Vol-2
CONTRACT: DOT-FA72WA-2705
MONITOR: FAA-RD 73-158-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-775 258.
DESCRIPTORS: *Airport radar systems, *Radar clutter, Search radar, Air traffic control systems, Radar reflections, Reduction, Signal processing, Pattern recognition, Video signals, Data acquisition (U)
IDENTIFIERS: Radar angels (U)

The goal of the study was to identify angel clutter reduction techniques which were cost-effective for the existing ASR-4, 5, and 6 radars. The report identifies a combination of techniques which can be implemented without major radar re-design and which improves the ASR surveillance capability. The Appendices provide a description of the field test instrumentation and supporting data and analyses. (Modified author abstract) (U)

AD- 775 290 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Report on DABS/ATCRBS (Discrete Address Beacon System/Air Traffic Control Radar Beacon System) Field Testing Program. (U)

DESCRIPTIVE NOTE: Project rept.,
FEB 74 52P Samson,J. R. ;Crocker,E. A. ;
REPT. NO. ATC-31
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 74-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Project report on Discrete Address Beacon System.
DESCRIPTORS: *Air traffic control systems, Radar beacons, Data links, Transmitting, Electromagnetic compatibility, Transponders (U)
IDENTIFIERS: Field tests, DABS(Discrete Address Beacon Systems), ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, Discrete address beacon systems (U)

The purpose of the field test program was to verify laboratory measurements of the effect of discrete address beacon system uplink signal formats on air traffic control radar beacon system transponders. The DABS interrogations tested were: (1) a combined ATCRBS Mode A/DABS All-Call consisting of a standard Mode A interrogation with an additional pulse following the P sub 3 pulse; (2) a DABS uplink message transmission consisting of a P sub 1-P sub 2 pulse pair followed by 25 microseconds of 4 megabit per second DPSK data modulation. The timing aspects of these waveforms were selected on the basis of a previous series of laboratory bench tests made in a small cross-section of the ATCRBS transponder population. The results of these field measurements performed on a larger cross-section of field operational ATCRBS transponders agree with the results of the bench testing program: (U)

AD- 775 258 17/7 17/9
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

Angel Clutter and the ASR Air Traffic Control Radar. Volume I. Study Results. (U)

DESCRIPTIVE NOTE: Final rept. Oct 71-Feb 73,
FEB 73 205P Barry,J. R. ;Carter,B. K. ;Erdahl,R. J. ;Harris,R. L. ;Miller,J. T. ;
REPT. NO. APL-MSO-F-195-Vol-1
CONTRACT: DOT-rA72WA-2705
MONITOR: FAA-RD 73-158-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-775 306.
DESCRIPTORS: *Airport radar systems, *Radar clutter, Search radar, Air traffic control systems, Radar reflections, Reduction, Signal processing, Video signals, Pattern recognition (U)
IDENTIFIERS: Radar angels (U)

The goal of this study was to identify angel clutter reduction techniques which were cost-effective for the existing ASR-4, 5, and 6 radars. This report identifies a combination of techniques which can be implemented without major radar re-design and which improves the ASR surveillance capability. These techniques were developed by through analysis of ASR video and track radar data gathered during the Spring 1972 bird migrations at Milwaukee's General Mitchell Airport. The proposed angel clutter reduction (ACR) features operate on the three major differences observed between angel and aircraft signal characteristics: signal strength, pulse-to-pulse amplitude fluctuations, and velocity. These ACR features were chosen becausethey provide the highest level of effectiveness consistent with timely implementation and a reasonable degree of radar modification. (Modified author abstract) (U)

AD- 774 789 1/5
MITRE CORP MCLEAN VA

FAA Report on Airport Capacity. Volume II. Eight Airport Survey. (U)

JAN 74 293P
REPT. NO. M74-12-Vol-2
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-5-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-774 784.
DESCRIPTORS: *Terminal flight facilities, *Airports, *Planning, Urban areas, Air traffic control terminal areas, Runways, International airports, Instrument flight, All weather aviation, Wake, Turbulence (U)
IDENTIFIERS: *Turbulent wake (U)

The report analyzes the impact of FAA programs on airport capacity over the next ten years. Eight major airports (Atlanta, Chicago O'Hare, Denver, Los Angeles, Miami, New York Kennedy, Philadelphia, and San Francisco) were examined in detail. The study found that these programs will have substantial benefits at the airports surveyed. VFR capacities will increase about 25% over today, and IFR about 50%. A major requirement will be the metering and spacing and wake vortex avoidance systems programs. With these systems in place, IFR capacity will rise from its present level of 75% of VFR capacity to about 90%, thus increasing the ability to maintain sustained all-weather operations. If these improvements are achieved, no airport surveyed will in the long term (1979-82) experience peak hour VFR saturation, and only one airport is projected to experience peak hour IFR saturation. (Modified author abstract) (U)

AD- 774 784 1/5
MITRE CORP MCLEAN VA

FAA Report on Airport Capacity. Volume I. National Summary. (U)

JAN 74 98P
REPT. NO. M74-12-Vol-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-5-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-774 789.
DESCRIPTORS: *Terminal flight facilities, *Airports, *Planning, Urban areas, Air traffic control terminal areas, Runways, International airports, Instrument flight, All weather aviation, Wake, Turbulence (U)
IDENTIFIERS: *Turbulent wake (U)

The report analyzes the impact of FAA programs on airport capacity over the next ten years. The results are reported in two volumes. The first volume forms a summary of the findings of the study; the second volume presents the detailed examinations of each of the selected airports. Eight major airports (Atlanta, Chicago O'Hare, Denver, Los Angeles, Miami, New York Kennedy, Philadelphia, and San Francisco) were examined in detail. The airside capacity of these airports can be extended, within the present E and D and F and E framework, to meet projected demand for the mid to late 1980's. Under current and proposed plans, most of the surveyed airports will have exceeded their landside capacity before these air traffic levels are reached. The problems are primarily physical access/egress/parking limitations. These will require new access concepts and possibly new major airports which should be planned for now. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 774 680 1/2
MITRE CORP MCLEAN VA

Feasibility Study for Automating the FAA Central Altitude Reservation Facility. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 73 63P Mueller,Gerald K. ;
REPT. NO. MTR-6416
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-EM 74-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic, *Management, Automation, Control, Air traffic control systems, Altitude, Feasibility studies (U)
IDENTIFIERS: CARF(Central Altitude Reservation Facility), Central altitude reservation facility (U)

The report documents a study of the Central Altitude Reservation Facility (CARF) of the Federal Aviation Administration. CARF has the responsibility for approving airspace reservations for missions that in general could not be accomplished without a reservation. The study was undertaken to determine whether the use of automation techniques could improve the efficiency and accuracy of the CARF operations in a cost effective manner, and to evaluate the impact of implementing CARF automation via the proposed Air Traffic Service Headquarters Computer. (Author) (U)

AD- 774 677 17/9 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

X-Band Terminal Radar Test and Evaluation. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Feb 73,
JAN 74 75P Bassford,Ronald S. ;
REPT. NO. FAA-NA-73-59
PROJ: FAA-021-241-050
MONITOR: FAA-RD 73-159

UNCLASSIFIED REPORT

DESCRIPTORS: *Airport radar systems, *Search radar, X band, Air traffic control systems, Performance(Engineering) (U)

An X-band radar system was evaluated to determine its capability to perform as an Airport Surveillance Radar. Included in the investigation were equipment tests to determine basic system parameters, flight tests to determine system coverage with respect to air traffic control requirements, tests to determine the capabilities of the system processor, and an operational evaluation performed by Van Nuys, California Air Traffic Control personnel. (Author) (U)

AD- 774 655 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Surveillance and Communication Issues in the Transition to a Discrete Address System, Task A. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 73 112P Wells,W. I. ;Kramer,R. ;
REPT. NO. ATC-21
CONTRACT: DOT-FA72WAI-242
PROJ: FAA-022-243-012, FAA-033-241-062
MONITOR: FAA-RD 73-125

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on ATC Surveillance/ Communication Analysis and Planning Project Report.
DESCRIPTORS: *Air traffic control systems, Radar beacons, Data links, Digital systems, Surveilla (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The report discusses the transition from the ATCRBS-based surveillance function with voice radio only to a DABS-based surveillance function with integral digital communication capability to support IPC and automation. Recommendations are directed toward alleviation of certain problems already evident and toward preparation for the dployment of DABS beginning in the late 1970's. (U)

AD- 773 849 17/7
HAZELTINE CORP GREENLAWN N Y

Position Location Analysis. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 72-15 Jan 73,
SEP 73 122P Sakson,P. ;Grossman,B. ;
Breda,J. ;
REPT. NO. 6174
CONTRACT: F30602-72-C-0477
MONITOR: RADC TR-73-293

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Data processing, Real time, Computer programming, Position(Location), Tracking, Spread spectrum, Display systems, Data links (U)

The program provided for the development of a real time data processing and display system for the Air Force's Low Cost Traffic Control (LCTC) experiment. The LCTC experiment will test the applicability of low-power, spread spectrum aircraft will test the applicability of low-power, spread spectrum aircraft transmissions to provide the basis for a low-cost, real time, precision, aircraft surveillance and collision avoidance system. The real time data processing and display system developed makes use of a PDP11 minicomputer and a CRT display. These equipments have been programmed to accept input data from two aircraft; the input data takes the form of a set of four binary coded decimal numbers read from four time interval counters, plus standard range time (from a digital clock). Typically, a new field of numbers arrives several times a second. The PDP11 processes this input data in real time and generates a plan position display of the aircraft tracks and their projected positions. The display also presents tabular information such as aircraft heading, velocity and altitude, along with time and collision information. (Modified author abstract) (U)

AD- 773 768 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DABS/ATCRBS Transponder Bench Testing Program. (U)

DESCRIPTIVE NOTE: Project rept.,
NOV 73 101P Samson,J. R. ;Welch,J. D. ;Becotte,E. R. ;Crocker,E. A. ;Schofield,H. D. ;
REPT. NO. ATC-25
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 73-160

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Discrete Address Beacon System.
DESCRIPTORS: *Air traffic control systems, *Transponders, Bench tests, Radar beacons, Data links, Data transmission systems (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The objective of the program was the determination of the effect on ATCRBS transponders of candidate modulation schemes in DABS uplink transmissions. Bench tests were conducted on twenty-two different transponder samples, including representative air carrier and general aviation transponders and a military transponder. In this report, individual test procedures are outlined, the reduced data are presented, and some conclusions regarding the selection of the DABS uplink waveforms based upon the data are given. The basis of these conclusions is a DABS design goal of generating the least interference to the existing ATCRBS system. In addition to performing tests whose purpose was the direct measurement of response of ATCRBS transponders to candidate DABS uplink waveforms, tests were also run to obtain other link-related characteristics, such as response to non-standard pulses. (Modified author abstract) (U)

AD- 773 699 17/7 1/5
MITRE CORP MCLEAN VA

Airport Surface Traffic Control Systems Deployment Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Feb 72-Sep 73,
JAN 74 142P Baran,G. ;Bales,R. A. ;
Koetsch,J. F. ;
CONTRACT: DOT-TSC-378
MONITOR: TSC,FAA-RD FAA-73-35,74-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Terminal flight facilities, *Airport control towers, *Air traffic control systems, Air traffic controllers, Airports, Visual perception, Meteorological parameters, Runways (U)
IDENTIFIERS: ASTC(Airport Surface Traffic Control), Airport surface traffic control (U)

The report summarizes the findings of an analysis of ASTC (Airport Surface Traffic Control) system requirements and develops estimates of the deployment potential of proposed system alternatives. The tower control problem areas were investigated by a survey of 19 airports including: visual observations, interviews with tower personnel, collection of data of record and an analysis of tower communication tape recordings at selected airports. Data were also collected from regional FAA authorities and airport authorities on facility expansion and improvement plans aimed at meeting the projected air traffic demand. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 773 449 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

The Relationships of Age and ATC Experience to Job Performance Ratings of Terminal Area Traffic Controllers, (U)

APR 73 52P Cobb,Bart B. ;Nelson,Peter L. ;Mathews,John J. ;
MONITOR: FAA-AM 73-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Performance(Human), *Air traffic controllers, *Job analysis, Jobs, Aging(Physiology), Mathematical analysis, Assessment, Ratings (U)
IDENTIFIERS: Experience (U)

The study involved the collection of experimental ratings of job performance and other data for several hundred journeymen radar control specialists of 17 high-IFR-traffic-density Terminal Area Traffic Control facilities. Significant inverse relationships were found between the job ratings and both chronological age and tenure in FAA ATC work. Results of a comparative analysis of data for dichotomized groups aged '40 and younger' and '41 and older within each of several length-of-experience groupings indicated that the younger subjects of every experience level tended to receive higher evaluations than those over 40 years old, and the greater mean differences in performance ratings pertained to the dichotomized age groups having over ten years experience. However, a regression analysis indicated that, when the than those over 40 years old, and the greater mean differences in performance ratings pertained to the dichotomized age groups having over ten years experience. However, a regression analysis indicated that, when the variance of age was theoretically nullified, or held constant, experience correlated only negligibly with performance. A similar analysis indicated that if the subjects had possessed identical amounts of experience, their ratings would still have correlated negatively, and significantly so, with their ages.

(U)

AD- 773 444 17/7

NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

NAS Enroute State A System Engineering and Analysis Investigation of System Problems Radar Data Loss. (U)

DESCRIPTIVE NOTE: Final rept. Oct 72-Mar 73,
JAN 74 23P Morgan,Harry T. , Jr;
REPT. NO. FAA-NA-73-60
MONITOR: FAA-RD 73-183

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar tracking, Systems engineering, Systems analysis, Data processing, Display systems, Reliability, Simulation (U)

A series of special engineering tests, designed specifically to evaluate NAS Model 3dl capability to reliably process and display radar data without loss, was conducted at the National Aviation Facilities Experimental Center (NAFEC) employing the Digital Simulation Facility and the System Support Facility. The report describes these tests and the results obtained. (Author) (U)

AD- 773 436 17/7 17/2.1

COMPUTER SCIENCES CORP FALLS CHURCH VA

Upgraded Third Generation Information Flow Requirements Analysis. Volume III. Appendices. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Sep 73,
SEP 73 292P Hansen,John C. ;Weirich,R. L. ;Stevens,E. ;Boseck,E. M. ;Adams,B. ;
CONTRACT: DOT-FA72WA-3072
MONITOR: FAA-RD 73-65-Vol-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-773 435.
DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Air traffic controllers, Data transmission systems, Data links, Air traffic control terminal areas, Air traffic, Management planning and control, Civil aviation (U)
IDENTIFIERS: *General aviation, *General aviation aircraft, *Collision avoidance (U)

Four appendices are included as support to the requirements analysis. Appendix A, entitled 'Representative Air-Ground Communications', is a transcript of recorded air-ground communications that occurred during a recent flight between Washington, D.C., and Philadelphia. Appendix B, entitled 'Current Air Activity and Communications Flow', provides a collection of available statistics and data relative to current levels of air activity and communications. Appendix C, entitled 'Collision Avoidance Critical Communication Delay in the Future Terminal Area', briefly treats the parameters involved in a real-time controller-aircraft loop with identification of the various time elements around the loop. Appendix D, entitled 'The UTG Environment', projects the future environment that most probably will affect upgraded third generation communications. (U)

AD- 773 435 17/7 17/2.1
COMPUTER SCIENCES CORP FALLS CHURCH VA

Upgraded Third Generation Information Flow Requirements Analysis. Volume II. Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Sep 73,
SEP 73 152P Hansen,John C. ;Weirich,R. L. ;Stevens,E. ;Boseck,E. M. ;Adams,B. ;
CONTRACT: DOT-FA72WA-3072
MONITOR: FAA-RD 73-65-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-773 434, and AD-773 436.
DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Air traffic controllers, Data transmission systems, Data links, Air traffic control terminal areas, Air traffic, Management planning and control, Civil aviation (U)
IDENTIFIERS: *General aviation, *General aviation aircraft, *Collision avoidance (U)

Contents: Methodology; Definition of requirements; Definition of primary information classes; Operations analysis; and, Information system requirements. (U)

AD- 773 434 17/7 17/2.1
COMPUTER SCIENCES CORP FALLS CHURCH VA

Upgraded Third Generation Information Flow Requirements Analysis. Volume 1. Summary. (U)

DESCRIPTIVE NOTE: Final rept. Mar-Sep 73,
SEP 73 62P Hansen,John C. ;Weirich,R. L. ;Stevens,E. ;Boseck,E. M. ;Adams,B. ;
CONTRACT: DOT-FA72WA-3072
MONITOR: FAA-RD 73-75-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-773 435.
DESCRIPTORS: *Air traffic control systems, *Communication and radio systems, Air traffic controllers, Data transmission systems, Data links, Air traffic control terminal areas, Air traffic, Management planning and control, Civil aviation (U)
IDENTIFIERS: *General aviation, *General aviation aircraft, *Collision avoidance (U)

FAA information transfer requirements are organized into four categories, representing National Aviation System Status, Flight Movement, Flight Planning and Air Traffic Management. The communications requirements are defined and analyzed for the 1975-1985 time frame. The analysis is based on air traffic forecasts for the time period and the communications associated with anticipated upgraded third generation air traffic planning, status, control, and management capabilities. These lead to a specific Statement of Requirements for air and ground communications applicable to flight operations in the upgraded third generation air traffic control environment. The report is presented in three volumes as follows: Volume 1 - Summary, Volume 2 - Analysis, and Volume 3 - Appendices. (Author) (U)

AD- 773 409 17/7 1/2
MITRE CORP MCLEAN VA

Intermittent Positive Control Computer Algorithms for Test Bed Experiments, (U)

OCT 73 97P McFarland,A. ;Telsch,R. ;
REPT. NO. MTR-6528
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 74-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aviation safety, Warning systems, Collisions, Screens(Displays), Data links, Algorithms, Computer programming (U)
IDENTIFIERS: IPC(Intermittent Positive Control), Intermittent positive control, *Collision avoidance (U)

The report is intended to be used with the OSEM approved Intermittent Positive Control system description to initiate the programming of the IPC test bed systems. It applies to both the Discrete Address Beacon System Experimental Facility at MIT Lincoln Laboratories and the IPC Phase I experiments at NAFEC. Detailed flowcharts are provided and logical system interfaces discussed. (Author) (U)

AD- 773 397 17/7 1/2
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan. Intermittent Positive Control. (U)

DESCRIPTIVE NOTE: Engineering and development rept. 1973-1977.
OCT 73 41P
REPT. NO. FAA-ED-01-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aviation safety, Warning systems, Collisions, Landing aids, Flight testing, Screens(Displays), Data lin (U)
IDENTIFIERS: IPC(Intermittent Positive Control), Intermittent positive control, *Collision avoidance (U)

The report outlines a research and development program leading to the development and evaluation of the Intermittent Positive Control (IPC) function. This work is being undertaken as part of FAA efforts to improve and upgrade the present air traffic control system. (Author) (U)

AD- 773 335 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Empirical Assessment of ATCRBS. (U)

DESCRIPTIVE NOTE: Final project rept., OCT 73 226P Cameron,A. G. ;Pruslin,D. H. ;
REPT. NO. ATC-16
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-242
PROJ: FAA-022-243-012, FAA-033-241-062
MONITOR: FAA-RD 73-139

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on ATC Surveillance/ Communication Analysis and Planning.
DESCRIPTORS: *Air traffic control systems, Radar beacons, Air traffic control terminal areas, Performance(Engineering), Assessment (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

The report discusses the operational performance of the FAA ATCRBS system, as determined from data extracted from the ARTS III digital processing system. Data was gathered from several sites including Andrews Air Force Base, (Md.), Logan International Airport (Boston, Mass.), and McCarran International Airport (Las Vegas, Nevada). Quantitative performance data, as well as discussion of the problem area and possible techniques and procedures for its solution, are provided in the areas of weak/broken targets, false targets, synchronous garble, interference, erroneous decoding, improper defruiter operation, and in sufficient angular resolution. A discussion of improvements that can alleviate some of the deficiencies of today's secondary radar (ATCRBS) system is included. (Author) (U)

AD- 773 313 17/7 1/3 13/12
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

Application of Monte Carlo Methods to Estimation of Collision Risks Associated with ATC Separation Standards. (U)

DESCRIPTIVE NOTE: Technical rept., JUN 73 46P Lloyd,D. E. ;Scott,P. P. ;
REPT. NO. RAE-TR-73104
MONITOR: DRIC BR-37072

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Aviation accidents, Prevention, Air traffic, Risk, Monte Carlo method, Great Britain (U)
IDENTIFIERS: *Collision avoidance, *Risk analysis (U)

The risk of collision between two aircraft, which are nominally separated by standard air traffic control procedures, depends on several quantities which cannot be determined exactly. This risk can, however, be estimated in several ways, one of which is to assign each indeterminate quantity a probability distribution and use Monte Carlo methods to combine these, giving a distribution of risk. It is this approach which is described in the report. Also presented is an example of the application of these methods, to the safety assessment of a proposed 90 mile lateral separation standard for North Atlantic jet aircraft. (Author) (U)

AD- 772 475 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Computer System Performance Measurement Techniques for ARTS III Computer Systems. (U)

DESCRIPTIVE NOTE: Final rept. Apr 72-Jun 73, DEC 73 112P Hobbs,V. J. ;Gertler,J. G. ;
REPT. NO. TSC-FAA-73-22
MONITOR: FAA-RD 73-195

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control terminal areas, Automation, Air traffic control systems, Display systems, Data processing, Radar beacons, Computerized simulation, Performance(Engineering) (U)
IDENTIFIERS: ARTS(Automated Radar Terminal System), Automated radar terminal system (U)

The potential contribution of direct system measurement in the evolving ARTS 3 Program is discussed and software performance measurement techniques are comparatively assessed in terms of credibility of results, ease of implementation, volume of data, extent of useful information derived, and computer resource requirements. Hardware Monitors, Simulation and other measurement tools are also described. The applicability of these measurement tools and techniques to the ARTS 3 system is indicated. (Modified author abstract) (U)

AD- 771 185 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Air Traffic Control/Collision Avoidance System Interface Simulation: Phase II. (U)

DESCRIPTIVE NOTE: Final rept. Jul 72-Jun 73, NOV 73 199P Jolitz,G. ;
REPT. NO. FAA-NA-73-40
PROJ: FAA-052-241-050
MONITOR: FAA-RD 73-140

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 72, AD-739 369.
DESCRIPTORS: *Air traffic control systems, *Aviation safety, *Collisions, *Avoidance, Interfaces, Simulation, Dynamics, Diverting, Air traffic controllers, Switching, Modes, Runways, High density, Threshold effects (U)
IDENTIFIERS: CAS(Collision Avoidance Systems), *Collision avoidance systems, Unequipped aircraft (U)

A second phase of dynamic simulation is reported to further investigate the nature and extent of interaction between the air traffic control (ATC) system and an airborne collision avoidance system (CAS). Objectives were to investigate the impact on ATC when the preemptive CAS diverted an equipped aircraft into an encounter with an unequipped aircraft, to investigate the effectiveness of a strategy for switching the CAS threat detection from full system mode to landing mode, and to explore the three-way interface between a proposed general aviation version of the CAS, the commercial CAS and ATC system. The environment was a high-density terminal area which provided for simultaneous approaches to parallel runways. (U)

AD- 771 177 17/7
MITRE CORP MCLEAN VA

Engineering and Development Program Plan: Program Structure and Objectives. (U)

JUL 73 43P
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-ED 00-A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes AD-750 224.
DESCRIPTORS: *Air traffic control systems, Management planning and control (U)

The Office of Systems Engineering Management (OSEM) has initiated an activity for the preparation of Program Plans covering the present twenty-two engineering and development programs within the Federal Aviation Administration (FAA). These plans are required to provide more detailed information on the objectives, goals, program structure, technical approach, resources, possible implementation, and a number of other aspects for each of these programs. This planning process has been formalized in order to provide a record of the status and availability of each plan. This document presents an introductory background to the planning process, the objectives in each of the program areas, and an index of the plans, available or under preparation. This Program Plan, 00-A, supersedes Program Plan, FAA-ED-00, Program Structure and Objectives, dated July 1972. (AD-750 224). (Author) (U)

AD- 771 088 9/3 17/7 20/14
IIT RESEARCH INST ANNAPOLIS MD

The Electromagnetic Compatibility of Aeronautical Communication and Navigation Systems with Radio Frequency Dielectric Heaters and Suppergenerative Receivers. (U)

DESCRIPTIVE NOTE: Final rept., OCT 72 132P Tabor,Fred ;Martin,Harry ;
CONTRACT: F19628-73-C-0031, DOT-FA70WAI-175
PROJ: AF-649E, FAA-213-516-035
MONITOR: ECAC,FAA-RD PR-72-045,72-802

UNCLASSIFIED REPORT

DESCRIPTORS: *Electromagnetic compatibility, *Air traffic control systems, Heaters, Radiofrequency, Radio receivers, Radiofrequency interference, Navigational aids, Radio equipment, Very high frequency, Degradation (U)
IDENTIFIERS: Dielectric heaters, Superregenerative receivers, Garage door openers (U)

Degradation thresholds of interference from radio frequency dielectric heaters and superregenerative receivers to aircraft communication and navigation receivers were established. Degradation thresholds so established were employed to assess the degradation to the aeronautical communication and navigation services under opeational conditions. The adequacy of the present regulatory limits governing the radiation from dielectric heaters and superregenerative receivers was examined from the standpoint of prevention of interference to the aeronautical services. (Author) (U)

AD- 770 794 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

A Synchronized Discrete-Address Beacon System. (U)

JAN 73 10P Amlie,Thomas S. ;
REPT. NO. FAA-EM-74-3

UNCLASSIFIED REPORT

Availability: Pub. in IEEE Transactions on Communications. vCOM-21 n5 p421-426 May 73.
DESCRIPTORS: *Air traffic control systems, *Radar beacons, Synchronism, Interrogation (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems, ATRCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems (U)

A measure of discipline must be imposed on the ground-based interrogator complex if a new discrete-address beacon system is to be compatible when introduced into the present air traffic control system. It is postulated that this discipline, if imposed in a certain manner, will provide a surveillance system that will provide several additional benefits and services to the aircraft operator at minimum cost and complexity. (Author) (U)

AD- 770 148 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Interrogation Scheduling Algorithms for a Discrete Address Beacon System. (U)

DESCRIPTIVE NOTE: Project rept., OCT 73 108P Spiridon,A. ;Kaminsky,A. D. ;
REPT. NO. ATC-19
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: FAA-RD 73-126

UNCLASSIFIED REPORT

DESCRIPTORS: *Air traffic control systems, *Radar beacons, Interrogation, Scheduling, Algorithms, Control, Computer programming, FORTRAN (U)
IDENTIFIERS: DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The report describes several scheduling algorithms that may form part of the interrogation management function of a discrete address beacon system. These include scheduling algorithms that can handle unequal message lengths and types which can schedule a message very rapidly (dynamic scheduling). The algorithms are evaluated in terms of the computation required to execute them and their packing efficiencies. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 770 073 17/7 9/2
AEROSPACE SYSTEMS INC BURLINGTON MASS

North Atlantic (NAT) Aided Inertial Navigation System Simulation. Volume II. Computer Program NATNAV User's Manual. (U)

DESCRIPTIVE NOTE: Final rept. Jun 72-Jan 73, JUL 73 147P Hoffman,William C. ;Bowie, Kathryn G. ;
CONTRACT: DOT-TSC-473
MONITOR: FAA-RD,TSC 73-112-Vol-2,FAA-73-23-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-770 072.
DESCRIPTORS: *Inertial navigation, *Air traffic control systems, *Computer programs, Computerized simulation, Instruction manuals, Hybrid systems, Air traffic, Atlantic Ocean, Errors, Radio navigation, Doppler navigation, Doppler radar, Kalman filtering, FORTRAN (U)
IDENTIFIERS: North Atlantic air traffic, NATNAV computer program, FORTRAN 4 programming language, CDC 3800 computers (U)

A user's manual is provided for Program NATNAV (North ATlantic NAVigation), a digital computer simulation program developed to evaluate the performance of navigation systems for future commercial NAT aircraft operations. Error models for aided-inertial navigation systems with external measurements from Doppler radar, Omega, satellite-ranging or air data are simulated. (Modified author abstract) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 770 072 17/7
AEROSPACE SYSTEMS INC BURLINGTON MASS

North Atlantic (NAT) Aided Inertial Navigation System Simulation. Volume I. Technical Results. (U)

DESCRIPTIVE NOTE: Final rept. Jun 72-Jan 73, JUL 73 196P Hoffman,William C. ; Hollister,Walter M. ;Britting,Kenneth R. ;
CONTRACT: DOT-TSC-473
MONITOR: FAA-RD,TSC 73-112-Vol-1,FAA-73-23-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-770 073.
DESCRIPTORS: *Inertial navigation, *Air traffic control systems, Hybrid systems, Errors, Simulation, Computerized simulation, Atlantic Ocean, Air traffic, Kalman filtering, Radio navigation, Doppler navigation, Doppler radar (U)
IDENTIFIERS: North Atlantic air traffic (U)

Current air traffic operations over the North ATlantic (NAT) and the application of hybrid navigation systems to obtain more accurate performance on these NAT routes are reviewed. A digital computer simulation program (NATNAV - North ATlantic NAVigation) is developed to evaluate the performance of navigation systems for future commercial NAT aircraft operations. Error models are developed for aided-inertial navigation systems with external measurements from Doppler radar, Omega, satellite-ranging or air data. (Modified author abstract) (U)

AD- 770 071 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airport Information Retrieval System (AIRS). (U)

DESCRIPTIVE NOTE: Final rept., OCT 73 86P Medeiros,Manuel F. ;Sussman, Julie ;
REPT. NO. TSC-FAA-73-25
MONITOR: FAA-RD 73-122

UNCLASSIFIED REPORT

DESCRIPTORS: (*Air traffic control systems, Automation), (*Information retrieval, Airports), Time sharing, Air traffic, Computer programming, Computer processing, Data management (U)
IDENTIFIERS: AIRS(Airport Information Retrieval Systems), Airport information retrieval systems (U)

The handbook is a support manual for a prototype air traffic flow control automation system developed for the FAA's Systems Command Center. The system is implemented on a time-sharing computer and is designed to provide airport traffic laod predictions and flow control support. The manual is designed for use by an experienced computer programmer. It contains instructions on performing the monthly AIRS data base updating including the Official Airline Guide data tape processing, the merging with the existing data base and the maintenance of the associated supporting data files. The manual describes the duties associated with monitoring nightly file checking and failsafe programs to assure data base integrity. The daily processing and troubleshooting of the system's usage records are also described. (Modified author abstract) (U)

AD- 769 336 17/9 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

The Effects of Interference on Monopulse Performance. (U)

DESCRIPTIVE NOTE: Technical note, AUG 73 35P McAulay,R. J. ;
REPT. NO. TN-1973-30
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: ESD TR-73-176

UNCLASSIFIED REPORT

DESCRIPTORS: (*Radar beacons, Electromagnetic interference), (*Monopulse radar, Electromagnetic interference), Air traffic control systems, Azimuth, Degradation, Multipath transmission (U)
IDENTIFIERS: ATCRBS(Air Traffic Control Radar Beacon Systems), Air traffic control radar beacon systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems (U)

The first and second moments of the monopulse azimuth estimates are used to characterize the estimator performance in a background of mainbeam or side-lobe multipath or ATCRBS interference. An exact expression for the bias error is obtained that not only accounts for the bias due to targets separated in azimuth but also demonstrates the effect of fading or signal cancellation. For a target signal at a 20 dB signal-to-noise ratio, it is shown that the fading effect produces negligible bias unless the signal-to-interference ratio is between plus or minus 2.5 dB. A first order expression for the variance is obtained that demonstrates that an increase in the random error will occur due to the target separation in azimuth and due to signal fades. The exact nature of the bias and variance depend strongly on the relative phase between the target and interference signals with the poorest performance being obtained at the in- and out-of-phase conditions. It is knowledge of this behaviour that is essential in evaluating the idea of azimuth estimation data editing. (Author) (U)

AD- 768 851 17/7
COMPUTER SCIENCES CORP FALLS CHURCH VA

Study of Oceanic Airspace and Ground Network Configurations in Satellite Systems. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 73 207P Klein,S. A. ;
REPT. NO. CSC-4183-1
CONTRACT: DOT-FA72WA-3102
MONITOR: FAA-RD 73-59

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION SATELLITES(ACTIVE)), NETWORKS, CONFIGURATION, COSTS, MATHEMATICAL MODELS, MANAGEMENT PLANNING AND CONTROL (U)
IDENTIFIERS: AIR ROUTE TRAFFIC CONTROL (U)

The report presents the final results of a study of oceanic airspace and ground network configurations in satellite systems. The purpose of the study was to investigate the restructuring of oceanic ATC (Air Traffic Control) airspace jurisdictional boundaries in the presence of a satellite system and to identify those future ATC jurisdictional configurations and ground facilities networks which most effectively utilize the satellite capability to obtain ground segment cost savings. The study was exploratory in nature and focused on the 1980 time frame. The analysis was limited to specified North Atlantic and Pacific oceanic regions. The evaluation of postulated CTA (Control Traffic Area) configurations was based on a cost indicator model which provides an estimate of the relative costs for ground system capital investment and operation and maintenance. The study considered only satellite systems and focused on cost differences. Therefore, the cost indicator model omitted those ground system elements common to all satellite systems and included only those factors which would change with reorganization of airspace boundaries or reallocation of ground facility tasks. In addition, the report presents detailed descriptions of the study assumptions, the cost indicator model, and the evaluation techniques. (U)

AD- 768 844 17/2 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Tandem Electronic Voice Switching (EVS) System. (U)

DESCRIPTIVE NOTE: Project plan,
JUN 73 144P Schroeder,John F. ;
REPT. NO. FAA-RD-73-133

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMMUNICATION SYSTEMS, *SWITCHING CIRCUITS), (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION SYSTEMS), INTEGRATED SYSTEMS, VOICE COMMUNICATIONS, AUTOMATION, SYSTEMS ENGINEERING (U)
IDENTIFIERS: AIR ROUTE TRAFFIC CONTROL CENTERS (U)

The Tandem Electronic Voice Switching (EVS) System Project Plan identifies responsibilities and describes events and activities which must be completed in order to integrate the Tandem EVS System with NAS En Route Stage A. Initial emphasis is on the installation and evaluation testing of a preproduction EVS System at NAFEC for which the System Research and Development Service has primary responsibility; however, the plan also addresses the implementation of production systems and provides for the transition of primary responsibility to the Airway Facilities Service for this activity. The Tandem EVS System Project Plan does not assign responsibilities, but rather amalgamates and synchronizes, the planning of participating organizations with respect to their inherent responsibilities for the Tandem EVS Project. (Author) (U)

AD- 768 839 17/7 5/8
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of Large Screen Display in the Automated Oceanic ATC Environment. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Jul 73,
OCT 73 45P Spingola,Anthony J. ;
Giordano,Robert L. ;
REPT. NO. FAA-NA-73-75
CONTRACT: FAA-102-150-020
MONITOR: FAA-RD 73-136

UNCLASSIFIED REPORT

DESCRIPTORS: (*DISPLAY SYSTEMS, *AIR TRAFFIC CONTROL SYSTEMS), AUTOMATION, FEASIBILITY STUDIES, SCREENS(DISPLAYS) (U)
IDENTIFIERS: LARGE SCREEN DISPLAYS, EVALUATION (U)

Specific objectives were to: (1) Determine what utility, if any, the LSD can be to the future automated oceanic ATC system. (2) Determine the most practical applications of the LSD within the automated oceanic ATC system. (3) Determine ocean air traffic controller preference, individual Cathode Ray Tube (CRT) display or LSD, for graphic presentation of ocean traffic. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 768 677 17/7
MCDONNELL DOUGLAS ELECTRONICS CO ST CHARLES MO

Synchronization Station Location Study Methodology Development. (U)

DESCRIPTIVE NOTE: Final rept. 1 Oct 72-May 73 on Phase 1,
JUL 73 219P Holt,J. M. ;Watson,F. D. ;Neumann,C. J. ;
CONTRACT: DOT-FA73WA-3172
MONITOR: FAA-RD 73-102

UNCLASSIFIED REPORT

DESCRIPTORS: (*TIME SIGNALS, SYNCHRONIZATION(ELECTRONICS)), (*AIR TRAFFIC CONTROL SYSTEMS, TIME SIGNALS), RADIO STATIONS, SITE SELECTION, AVIATION SAFETY, AIR TRAFFIC, NUMERICAL ANALYSIS, EFFECTIVENESS (U)
IDENTIFIERS: COLLISION AVOIDANCE (U)

A technology for evaluating ground station sites on the basis of their effectiveness in disseminating time synchronization has been produced. Analytical studies have complemented the concept of computer modeling of the airspace population, then quantitatively assessing the effectiveness of various configurations and deployment of time disseminating equipments. Operations of major U.S. scheduled aircarrier aircraft operating in CONUS have been discretely modeled; for a given day and time-of-day, the altitude, latitude and longitude of each aircraft is computed. Then, air-to-air and air-to-ground communication linkages are determined. In addition to producing data for use by the computer, these processes produce maps of aircraft activity versus time of day for direct interpretation. (Modified author abstract) (U)

AD- 768 202 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

System Integration and System Shakedown Tests, NAS Enroute Stage A Model A3d1. (U)

DESCRIPTIVE NOTE: Final rept. Sep 72-Apr 73,
OCT 73 77P Levy,Joseph ;Crawford,Victor ;
REPT. NO. FAA-NA-73-55
PROJ: FAA-121-105-010
MONITOR: FAA-RD 73-135

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SYSTEMS ENGINEERING, INTEGRATED SYSTEMS, TESTS (U)
IDENTIFIERS: *AIR ROUTE TRAFFIC CONTROL (U)

A series of tests of the National Air Space (NAS) Enroute Stage A Model A3d1 System were conducted over a period of seven months in a total system environment using simulated and live radar inputs to evaluate the total system capability to accomplish the air traffic control task and to provide guidance for conduct of system integration and system shakedown tests at field facilities. The report describes these tests and the results obtained. (Author) (U)

AD- 767 453 17/7
META SYSTEMS INC SANTA CLARA CALIF

Potential Conflict Prediction and Associated Functions for Oceanic Air Traffic Control Automation. (U)

DESCRIPTIVE NOTE: Final rept. Mar 72-May 73,
MAY 73 58P Giallanza,Frank V. ;
Giallanza,Charles P. ;Brown,James C. ;
CONTRACT: DOT-FA72WA-2851
MONITOR: FAA-RD 73-73

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), AIR TRAFFIC, COMPUTER PROGRAMS, PREDICTIONS, SCHEDULING, OCEANS (U)
IDENTIFIERS: ROUTING (U)

Algorithms to determine potential conflicts over an ocean airspace based on given vertical, lateral, and longitudinal separation criteria were developed. Additional algorithms to handle special cases have yet to be developed. Associated functions used by air traffic controllers to resolve conflict situations are also described. (Author)
Portions of this document are not fully legible. (U)

AD- 767 369 17/2.1 17/7
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Conference on Satellite Systems for Mobile Communications and Surveillance, 13-15 March 1973, London. (U)

DESCRIPTIVE NOTE: Conference rept., JUL 73 37P Kinnie,I. G. ;Waynick,A. H. ;
REPT. NO. ONRL-C-14-73

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIO RELAY SYSTEMS, COMMUNICATION SATELLITES(ACTIVE)), (*AIR TRAFFIC CONTROL SYSTEMS, RADIO RELAY SYSTEMS), SYMPOSIA, AIRCRAFT, SHIPS, TRANSPONDERS, AIRCRAFT ANTENNAS, GREAT BRITAIN (U)

A fairly detailed report is presented on an international conference on the use of satellite systems for intercontinental mobile communications and surveillance. These have been termed an Aerosat system for commercial aircraft and a Marsat system for ships. Some details on the operation of the Skynet military satellite communications system are also reported upon. (Author) (U)

AD- 767 075 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

The 1972 Los Angeles Basin Standard Air Traffic Model. (U)

DESCRIPTIVE NOTE: Final rept., SEP 73 49P Willett,Francis M. , Jr;
REPT. NO. FAA-NA-73-51
CONTRACT: DOT-HS-013-601-010
MONITOR: FAA-RD 73-90

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Apr 73, AD-766 324.
DESCRIPTORS: (*AIR TRAFFIC, MATHEMATICAL MODELS), (*CALIFORNIA, AIR TRAFFIC), AIR TRAFFIC CONTROL SYSTEMS, REVIEWS (U)

The report describes the methodology used in the construction of a three-dimensional aircraft movement operating in the Los Angeles Basin Area. From data obtained, the Los Angeles Basin Air Traffic Model of 1972 was constructed. The mode, contains approximately 80% VFR flight operations, and represents a particular time period of nonpeak aircraft operations which occurred during a three-hour period on the 20th of August 1972. The purpose of the traffic sample is to develop a standard model to test future air traffic systems and equipment. Since most air traffic operation models are generally made from IFR-controlled operations, this is the first of a series of air traffic models that include both IFR and VFR operations. (Modified author abstract) (U)

AD- 766 938 17/7
MITRE CORP MCLEAN VA

Evaluation of ATCRBS Performance in an Interference Environment. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 72 216P Jones,Stanley R. ;
REPT. NO. MTR-6239
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR BEACONS, *AIR TRAFFIC CONTROL SYSTEMS), RADIOFREQUENCY INTERFERENCE, ELECTROMAGNETIC COMPATIBILITY, RELIABILITY(ELECTRONICS) (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

Uplink and downlink ATCRBS interference measurements in terminal areas were coordinated with assessments of the sources of these mutual interference conditions. The average values of these observations as well as many burst characteristics corroborated the results of an analytical model coupling the environmental features to their effects on the surveillance system. Simulation efforts based on statistical representation of the input conditions enabled an association of these interference levels with deterioration in performance of the ARTS III and TPX-42 processors. Results of these modeling efforts indicate that the performance of both processors is degraded for transponder reply probabilities below 0.85; both systems exhibit a relatively high level of immunity to reasonably expected fruit rates. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 765 383 17/9 17/7 20/14
CALSPAN CORP BUFFALO N Y

Fresnel Diffraction of RF Wavefronts. (U)

DESCRIPTIVE NOTE: Final rept. Dec 71-Feb 73,
FEB 73 188P Bein,George P. ;
REPT. NO. CALSPAN-AG-5082-E-1
CONTRACT: DOT-FA72WA-2782
PROJ: FAA-213-620
MONITOR: FAA-RD 73-34

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR SIGNALS, *DIFFRACTION), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR TRACKING), (*RADIO NAVIGATION, INTERFERENCE), COMPUTER PROGRAMMING, VERY HIGH FREQUENCY, S BAND (U)

The objective of this program was to develop the necessary mathematics including a computer program to predict and define the RF and geometric shadow of any proposed (or existing) obstruction in the coverage volume of airspace of radar facilities operating in appropriate aeronautical service bands. The RF shadow calculation includes the effects of Fresnel diffraction by a perfectly-conducting rectangular obstruction through the use of Geometric Diffraction Theory. Both the line-of-sight (geometrical-optic) shadow and Fresnel diffraction effects are calculated by the computer program for arbitrary incidence and observation angles relative to the obstacle. Signal degradation relative to the obstacle-free field, and for desired combinations of transmit and receive polarizations, was described by providing plots of arbitrarily chosen dB levels at chosen observation planes behind the obstruction. Circularly cylindrical, spherical, and convex polyhedron obstructions were also considered but only to determine geometric shadowing. A flight test program was conducted to experimentally validate the computer program using a rectangular obstruction at three different viewing angles. The experimental results were in good agreement with predicted values. (Author) (U)

AD- 765 339 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airport Information Retrieval System (AIRS) User's Guide. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 73 121P Medeiros,Manuel F. ;Sussman, Julie ;
REPT. NO. TSC-FAA-73-24
MONITOR: FAA-RD 73-121

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *DATA TRANSMISSION SYSTEMS), AIR TRAFFIC CONTROLLERS, DATA PROCESSING, INFORMATION RETRIEVAL, TIME SHARING, COMPUTATIONAL LINGUISTICS, INSTRUCTION MANUALS, SCHEDULING (U)

The handbook is a user's guide for a prototype air traffic flow control automation system developed for the FAA's System Command Center. The system is implemented on a time-sharing computer and is designed to provide airport traffic load predictions and flow control support. The User's Guide is a reference manual designed for use by the air traffic controllers and does not require any previous computer experience. The AIRS request (command) language is explained along with instructions on using remote teletype and graphical display terminals in working with the time-sharing computer. The manual tells the user how to obtain airport traffic demand data, flight listings, plots, arrival delay predictions and flow control assistance. It also describes how to enter operational data such as landing capacity estimates and how to add (or cancel) flight schedules to the AIRS centralized data base. (Author) (U)

AD- 765 153 1/2 17/7
MITRE CORP MCLEAN VA

Extrapolated Methodology Used in the Los Angeles Basin Standard Traffic Model. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 73 19P Maginnis,Frank ;Cohen,Saul ;
REPT. NO. MTR-6386
CONTRACT: DOT-FA70WA-2448
PROJ: FAA-013-601-010
MONITOR: FAA-RD 73-86

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC, MODELS(SIMULATIONS)), AIR TRAFFIC CONTROL SYSTEMS, PLANNING, FLIGHT PATHS, SCHEDULING, STATISTICAL ANALYSIS, CALIFORNIA (U)
IDENTIFIERS: TIME COMPRESSION, DIGITAL SIMULATION (U)

The Los Angeles Basin Standard Traffic Model is a computer model of the air traffic expected in the basin in 1982. The report explains the methodology used to project into the 1982 time frame a similar model of 1972 traffic. A technique known as time compression was used to make the projection. This report also defines the two types of models produced, the snapshot and scan-by-scan models, and it explains how the former was extracted from the later. (Modified author abstract) (U)

AD- 764 682 17/7 1/4
STANFORD RESEARCH INST MENLO PARK CALIF

Analysis of Automatic Aircraft Altitude Reporting Using the Air Traffic Control Radar Beacon System. (U)

DESCRIPTIVE NOTE: Final rept. Jun 72-Apr 73,
APR 73 111P Couluris,G. J. ;
CONTRACT: DOT-FA70WA-2142
PROJ: FAA-031-241-026, SRI-8181
MONITOR: FAA-RD 73-44

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR BEACONS, HEIGHT FINDING), (*AIR TRAFFIC CONTROL SYSTEMS, DATA PROCESSING), AIR TRAFFIC, PLAN POSITION INDICATORS, DATA TRANSMISSION SYSTEMS, ALTIMETERS, PILOTS, STATISTICAL DATA, FLIGHT INSTRUMENTS (U)

The report documents work measuring the degree of relative correspondence between simultaneous automatic aircraft altitude reports and oral altitude reports from pilots recorded on magnetic tape at two FAA terminal area ATC facilities and one enroute ATC facility. The frequency of occurrence of the resulting observed deviations between automatic and pilot reports are tabulated by deviation magnitude and by phase of operation (i.e., climb, descent, and level) and control facility; probable causes of observed deviations are identified. (Author) (U)

AD- 764 681 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

Engineering and Development Program Plan - Air Traffic Control Technology. (U)

JUL 73 48P
REPT. NO. FAA-ED-16-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RESEARCH MANAGEMENT), CATHODE RAY TUBE SCREENS, COLOR TELEVISION TUBES, INPUT OUTPUT DEVICES, TEST SETS, COMPUTERS, SCHEDULING, COSTS (U)

The technology program plan is one in a series of program plans published to document the Engineering and Development activities of the Federal Aviation Administration (FAA). It describes current and planned activities to examine advanced concepts and techniques and to evaluate their application in the Air Traffic Control (ATC) environment. The program is divided into two major categories: Data Entry and Display Technology and Advanced Computer Technology. The National Aviation Facilities Experimental Center (NAFEC) and the Transportation Systems Center (TSC) are involved in accomplishing this program. (Author) (U)

AD- 764 668 17/7 1/5
MITRE CORP MCLEAN VA

Reduction of Parallel Runway Requirements. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 73 61P Haines,Andrew L. ;
REPT. NO. MTR-6282
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-EM 73-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*RUNWAYS, SEPARATION), (*AIR TRAFFIC CONTROL SYSTEMS, RUNWAYS), TERMINAL FLIGHT FACILITIES, AVIATION SAFETY, RADAR LANDING CONTROL, FLIGHT PATHS, DATA TRANSMISSION SYSTEMS, DETECTORS (U)

The report presents results and recommendations concerning the relaxation of spacing requirements for independent instrument flight rules parallel approaches into closely spaced runways. All results presented in the report are derived by analyzing what system design or performance changes are required (eitner airborne or ground based) so as to result in safety equal to the current system's, but at closer spacing. A set of system changes and improvements are specified which, based on analysis, will permit closer runway spacing. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 764 202 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Airport Information Retrieval System (AIRS) System Design. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 73 174P Medeiros,Manuel F. ;Sussman, Julie ;
REPT. NO. DOT-TSC-FAA-73-16
MONITOR: FAA-RD 73-77

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DATA PROCESSING), (*AIR TRAFFIC, *SCHEDULING), INFORMATION RETRIEVAL, AIR TRAFFIC CONTROL TERMINAL AREAS, AIR TRAFFIC CONTROLLERS, CORE STORAGE, MAGNETIC CORES, COMPUTATIONAL LINGUISTICS, INPUT OUTPUT DEVICES, DATA TRANSMISSION SYSTEMS, AUTOMATION (U)

The report presents the system design for a prototype air traffic flow control automation system developed for the FAA's Systems Command Center. The design was directed toward the immediate automation of airport data for use in traffic load predictions and flow control operational support. The system employed computer services offered by commercial time-sharing companies. The system was also designed to serve as a technology foundation and an experimental tool from which subsequent automation specifications could be derived. The report covers the design decisions associated with the data base, the user interface, the user language, the special processing and the numerous operational considerations. Also included are the supporting program designs for data base updating and integrity maintenance. Finally, the report presents several recommended improvements to the automation system. (Author) (U)

AD- 763 936 17/7 20/1
IIT RESEARCH INST CHICAGO ILL

Study of Noise in Air Route Traffic Control Center, Flight Service Station, Air Traffic Control Tower, and Remote Facilities. (U)

DESCRIPTIVE NOTE: Final rept. 18 Nov 71-18 May 72,
OCT 72 32P Clinch,J. M. ;Wakeley,H. G. ;
REPT. NO. IITRI-J6250
CONTRACT: DOT-FA71WA-2587
MONITOR: FAA-RD 72-104

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *NOISE), AIR TRAFFIC CONTROL TERMINAL AREAS, AIRCRAFT NOISE, ENGINE NOISE, THRESHOLDS(PHYSIOLOGY), ACOUSTIC INSULATION, SITE SELECTION, ACOUSTIC EQUIPMENT (U)
IDENTIFIERS: *NOISE EXPOSURE, *NOISE REDUCTION, *NOISE (U)

The report describes various methods of reducing noise in several FAA Air Traffic Control and Navigational Facilities that exceed the facility noise criteria recommended in a previous report. Noise control procedures for each facility under consideration are described as well as the reasons for selecting specific noise reduction methods. (Author) (U)

AD- 763 603 17/7
COLLINS RADIO CO CEDAR RAPIDS IOWA

Curved Approach Path Study. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 73 126P Duning,K. E. ;Hemesath,N. B. ;Hickok,C. W. ;Lammers,D. G. ;Goemaat, M. L. ;
REPT. NO. 523-0764756-0011M
CONTRACT: DOT-FA72WA-2824
MONITOR: FAA-RD 72-143

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL TERMINAL AREAS, *APPROACH), CURVED PROFILES, LANDING AIDS, FLIGHT PATHS, ANALYSIS, AUTOMATIC PILOTS, INSTRUMENT FLIGHT, MICROWAVE EQUIPMENT (U)
IDENTIFIERS: *LANDING AIDS, *MICROWAVE EQUIPMENT (U)

The application of MLS (microwave landing systems) to provide increased operational flexibility and improved capacity in the terminal area is discussed. The performance characteristics of the various classes of CTOL aircraft which influence terminal area flight path design are identified and documented. Terminal area operational concepts and flight path families for use in the MLS environment are developed, and examples of special noise abatement paths are discussed. The implications upon cockpit equipment of flying flexible paths in the MLS environment are addressed, and the performance of current flight control systems in tracking segmented paths is examined. (Author) (U)

AD- 763 597 17/7
LITTLE (ARTHUR D) INC CAMBRIDGE MASS

Indices for Evaluating ATC Terminal Area Operations and Their Role in Cost/Benefit Analyses. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 73 202P Boulogiane,Ifigenia A. ;
Everett,John L. ;Koopman,Bernard O. ;Odoni,
Amodeo R. ;Raisbeck,Gordon ;
REPT. NO. ADL-71860
CONTRACT: DOT-FA70WA-2141
MONITOR: FAA-RD 73-52

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Oct 70 AD-716 659.
DESCRIPTORS: (*AIR TRAFFIC CONTROL TERMINAL AREAS, MANAGEMENT ENGINEERING), FEASIBILITY STUDIES, OPERATION, AVIATION SAFETY, PERFORMANCE(ENGINEERING), DATA, SIMULATION (U)
IDENTIFIERS: BENEFIT COST ANALYSIS (U)

The feasibility was studied of devising indices which could be used to assess the performance of an ATC terminal area. These indices are to be based on easily available data and designed to reflect system degradation, safety and system workload. The report presents a prototype analysis of data relating to the Boston Terminal Area. It is concluded that indices can be devised and their relationship established with environmental variables such as congestion, weather, equipment outrages, etc. These relations show which of these variables are the most significant and their relative magnitudes in influencing performance. The report also discusses the role of simulation in terminal area improvement evaluation. An unambiguous definition of operational delay is proposed. Finally, a cost/benefit paradigm is presented for the Boston Terminal Area. Portions of this document are not fully legible. (U)

AD- 763 557 1/2 5/10
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Frequency of Anti-Collision Observing Responses by Solo Pilots as a Function of Traffic Density, ATC Traffic, and Competing Behavior, (U)

APR 73 8P Lewis,Mark F. ;
MONITOR: FAA-AM 73-6

UNCLASSIFIED REPORT

DESCRIPTORS: (*PILOTS, PERFORMANCE(HUMAN)), (*AIR TRAFFIC CONTROL SYSTEMS, *AVIATION SAFETY), FLIGHT SIMULATORS, VISUAL ACUITY, REACTION(PSYCHOLOGY), AIR TRAFFIC, FLIGHT PATHS, ANALYSIS OF VARIANCE (U)
IDENTIFIERS: *COLLISION AVOIDANCE, VFR(VISUAL FLIGHT RULES), VISUAL FLIGHT RULES (U)

Eighteen instrument-rated pilots were flown in two-hour simulated solo missions during which the frequency of traffic, ATC warnings, and ATC clearances were varied, while the visibility of the target was held constant at 100%. In order to observe the target, the pilot was required to make a simple, overt observing response; i.e., the pilot has to press a button on his control wheel. If traffic was present, a burst of flashes became visible through the windshield. Button presses in the absence of traffic produced no stimulus. Each pilot was his primary responsibility to maintain visula vigilance, although ATC would endeavor to warn him of possible conflicting traffic. Two values of traffic frequency were programmed independently of two values of ATC traffic warning frequency. The frequency of competing behavior was varied by independent scheduling of two values of ATC clearance frequency. (Modified author abstract) (U)

AD- 763 549 17/7 17/2.1
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan- Satellite Experimentation. (U)

MAR 73 52P
PROJ: FAA-171-251
MONITOR: FAA-ED 17-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADIO RELAY SYSTEMS), (*RADIO RELAY SYSTEMS, COMMUNICATION SATELLITES(ACTIVE)), MULTIPATH TRANSMISSION, DATA TRANSMISSION SYSTEMS, EXPERIMENTAL DESIGN (U)
IDENTIFIERS: ATS-5 SATELLITE (U)

This Program Plan is one of a number of Program Plans which cover FAA's engineering and development activities. Two of these Program Plans cover work devoted to the application of space technology to air traffic control. One plan (AEROSAT Program Plan, FAA-ED-17-2), covers the planning, development, engineering, experimentation, and evaluation of an aeronautical satellite communication capability over the Atlantic Ocean while this plan covers the development and design data and techniques through analysis and experimentation. (Author) (U)

AD- 763 508 5/10
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Job Attitudes of Air Traffic Controllers: A Comparison of Three Air Traffic Control Specialties, (U)

JAN 73 35P Smith,Roger C. ;
MONITOR: FAA-AM 73-2

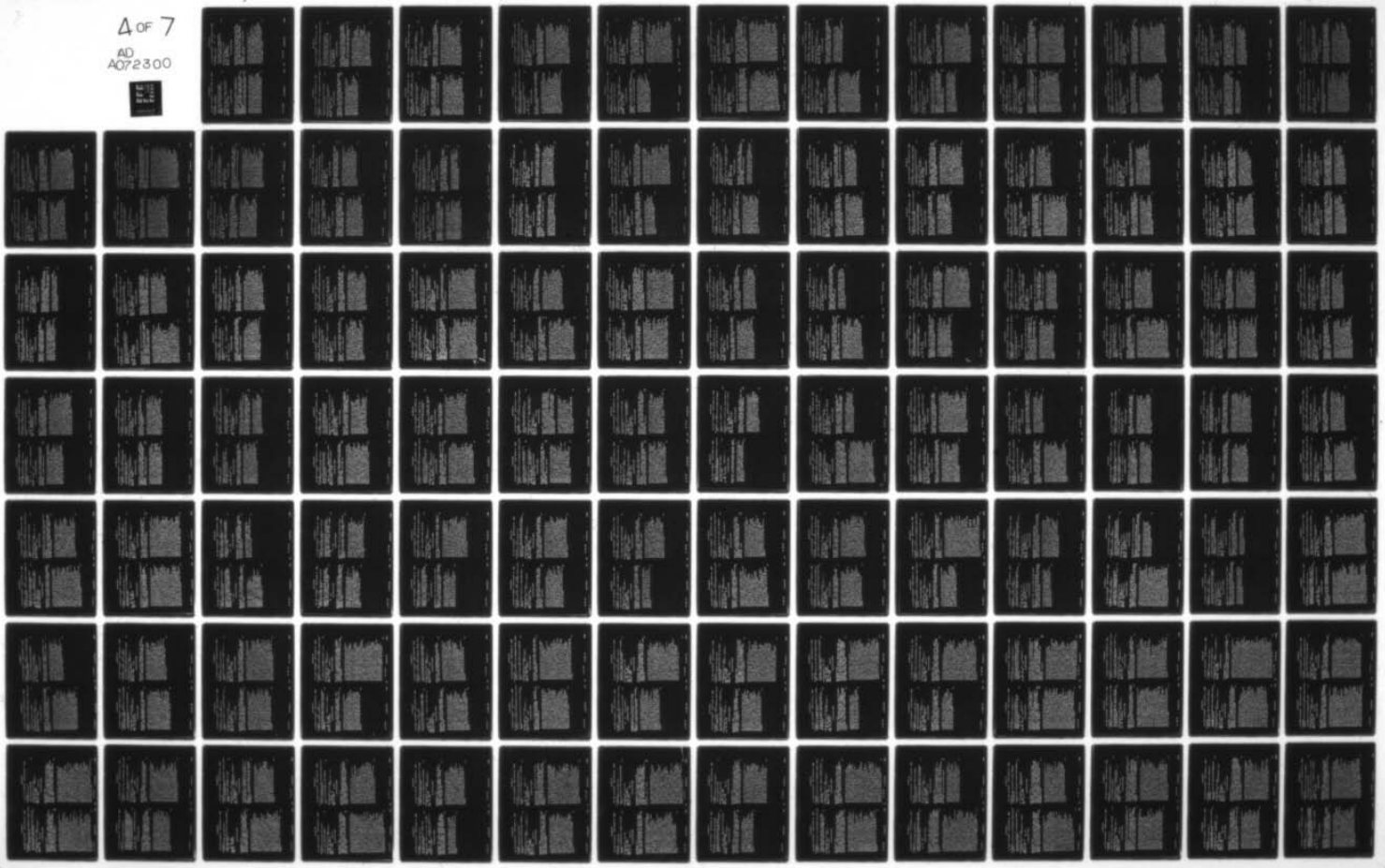
UNCLASSIFIED REPORT

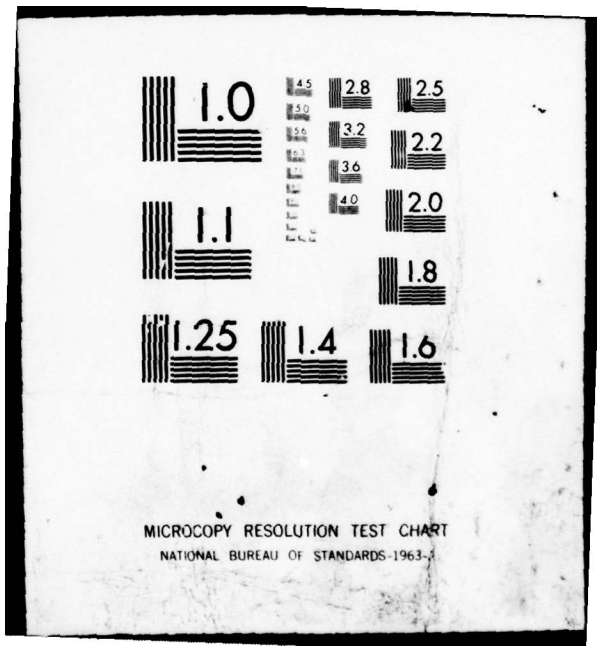
DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, *ATTITUDES(PSYCHOLOGY)), JOB ANALYSIS, QUESTIONNAIRES, MOTIVATION, PSYCHOLOGICAL TESTS, FACTOR ANALYSIS, MANPOWER (U)
IDENTIFIERS: WORK SHIFTS, JOB SATISFACTION (U)

792 JOURNEYMAN AIR TRAFFIC CONTROLLERS FROM ARTCC, TRACON, and FSS facilities answered a four-part questionnaire concerning (a) what they liked and disliked about ATC work, (b) how much they liked or disliked certain specific aspects of ATC work, (c) how they felt about shift work, and (d) their level of job satisfaction. The three ATC specialties are compared for agreement in their job-related attitudes. The most negative attitudes were associated with night shifts. The findings are discussed in terms of the similarity of the controller groups to members of other occupations, and in terms of the significance of the findings for improving controller morale. (U)

AD-A072 300 DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA F/G 1/2
AIR TRAFFIC CONTROL SYSTEMS.(U)
JUL 79
UNCLASSIFIED DDC/BIB-79/04 NL

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NATIONAL BUREAU OF STANDARDS-1963-A

AD- 763 328 17/7
MITRE CORP BEDFORD MASS

Feasibility Analysis of an Air Traffic Control Radar Beacon System (ATCRBS) Based Surface Trilateration Surveillance System. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun-1 Sep 72, JUN 73 232P Vinatieri,John D. ;
CONTRACT: DOT-TSC-393
MONITOR: FAA-RD 73-75

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Transportation Systems Center, Cambridge, Mass. Contract DOT-PPA-FA-321.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), (*AIRPORT RADAR SYSTEMS, RADAR BEACONS), RADAR TRACKING, SURFACE TARGETS, FEASIBILITY STUDIES, TRANSPONDERS (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

Analysis indicates there are feasible methods for achieving surveillance of vehicles on the airport surface by means of time-of-arrival measurements of the vehicle's ATCRBS Transponder reply at three or more receiver sites. The report contains a definition of an ATCRBS based surface surveillance system, analyses of various problems and techniques to achieve a satisfactory data acquisition subsystem, and criteria for conducting a test program for further verification of feasibility and design. (U)

AD- 763 142 1/2 17/7 1/5
MITRE CORP MCLEAN VA

An Extension of the Throughput Runway Capacity Methodology to Include Multiple Glide Path Lengths and Angles. (U)

DESCRIPTIVE NOTE: Final rept.
MAY 73 58P
REPT. NO. MTR-6338-Vol-5
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-QS 73-3-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 4, AD-762 082.
DESCRIPTORS: (*AIRCRAFT LANDINGS, SCHEDULING), (*AIR TRAFFIC CONTROL SYSTEMS, *FLIGHT PATHS), GLIDE PATH SYSTEMS, APPROACH, RUNWAYS, AIR TRAFFIC, QUEUEING THEORY, SHORT TAKEOFF AIRCRAFT, INSTRUMENT FLIGHT, AIRPORTS (U)
IDENTIFIERS: *SHORT HAUL AIR TRANSPORTATION, INSTRUMENT FLIGHT RULES (U)

The report extends the single runway IFR (Instrument Flight Rules) capacity methodology developed in MTR-4102 to include multiple glide path lengths and angles. Particular emphasis was placed on examples which are representative of short-haul operations. Analysis was performed to indicate the sensitivity of the model to the glide path parameters, approach control system precision, separation standards, and approach speed mixes. A combination of altitude separation on the glide path is considered as a means of increasing capacity. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 763 138 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Digital Simulation Facility/System Support Facility Interface Tests. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Oct 72,
JUL 73 36P Reyers,R. R. ;
REPT. NO. FAA-NA-73-33
MONITOR: FAA-RD 73-67

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, SIMULATION), (*TEST FACILITIES, AIR TRAFFIC CONTROL SYSTEMS), (*RADAR TARGETS, SIMULATION), DIGITAL SYSTEMS, RADAR (U)
IDENTIFIERS: DIGITAL SIMULATION (U)

Over a period of 9 months, a series of tests was conducted to interface the Digital Simulation Facility (DSF) with the System Support Facility (SSF) at the National Aviation Facilities Experimental Center (NAFEC). Included were tests of the DSF performance, as well as tests of the hardware interface to the 9020 Computer, and the software interface to the NAS Model 3d1 program. The report describes these tests and the results obtained. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 763 135 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Operational Problems of the Air Traffic Control Radar Beacon System. 1972 Seminar Held at the Shelburne Hotel, Atlantic City, New Jersey, on February 8 through 11, 1972. (U)

DESCRIPTIVE NOTE: Rept. for Feb 71-Feb 72.
APR 73 258P
REPT. NO. FAA-NA-72-80
PROJ: FAA-999-009-100

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SYMPOSIA), (*RADAR BEACONS, AIR TRAFFIC CONTROL SYSTEMS), RADAR TARGETS, TARGET ACQUISITION, ATTENUATION, RADIOFREQUENCY INTERFERENCE, TRANSPONDERS, RADAR TRACKING, OPERATION (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

The Air Traffic Control Radar Beacon System (ATCRBS) Seminar was the first of its kind dealing specifically with ATCRBS problems. Personnel attended the seminar from management, research, maintenance and operational organizations of the Federal Aviation Administration. Papers presented by 26 attendees are reproduced along with partial transcripts from associated discussions. The subject material is arranged according to the following titles which correspond to the workshops of the seminar: Introduction, Broken Targets, False Emergency Alarms, Electromagnetic Interference, False Targets, Missing Targets and Fading. (Modified author abstract) (U)

AD- 762 728 5/9 17/7 13/10
NAVAL AIR DEVELOPMENT CENTER WARMINSTER PA AIR VEHICLE TECHNOLOGY DEPT

The Landing Signal Officer: A Preliminary Dynamic Model for Analyses of System Dynamics. (U)

DESCRIPTIVE NOTE: Phase rept., APR 73 50P Smith,Ralph H. ;
REPT. NO. NADC-72078-VT
PROJ: A320-5301-202-B/2F00-421-204

UNCLASSIFIED REPORT

DESCRIPTORS: (*CARRIER LANDINGS, MATHEMATICAL MODELS), (*AIRCRAFT CARRIERS, *AIR TRAFFIC CONTROL SYSTEMS), FLIGHT DECKS, COMPUTER PROGRAMS, PERFORMANCE(HUMAN), VISUAL PERCEPTION, APPROACH, DESCENT TRAJECTORIES, DYNAMICS (U)
IDENTIFIERS: *LANDING, *MILITARY PERSONNEL, *SIGNALS (U)

A prototype model for the LSO (Landing Signal Officer) is developed. The model is derived based on considerations of the nature of the carrier landing task, human sensory characteristics, and LSO-to-pilot communications methodology. A central consideration in the derivation of the LSO model is seen to be the separate strategies that can be employed by the pilot and the LSO. The model is described via a digital computer program. It is used for two examples to demonstrate how, by appropriate calls, the LSO can prevent a ramp strike. A third example uses the MOVLAS to explore an alternative and far simpler approach to LSO modeling in those situations where the LSO-to-pilot communications can be linearized by an appropriate display. (Author) (U)

AD- 762 082 17/7
MITRE CORP MCLEAN VA

En Route Air Traffic Control Scenarios for the Quiet Short-Haul Air Transportation System. (U)

DESCRIPTIVE NOTE: Final rept., MAY 73 41P Loefflor,T. F. ;Ditmore,M. A. ;
REPT. NO. MTR-6338-Vol-4
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-QS 73-3-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 3, AD-761 378.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MANAGEMENT PLANNING AND CONTROL), AIR TRAFFIC, AIR TRANSPORTATIO (U)
IDENTIFIERS: SHORT HAUL AIR TRANSPORTATION (U)

The report describes the analysis done to define the en route ATC implications of an improved short-haul air transportation system for the time period of 1976 to 1980. As the short-haul system for this time period has not been defined in detail, city origin/destination pairs were not available, and in lieu of such information, a scenario approach was taken utilizing the city pairs of Washington, D. C. to New York, Philadelphia to Boston, and Houston, Texas to Memphis, Tennessee to cover a wide range of traffic densities and en route conditions. The New York to Washington scenario was chosen to stress the en route system; and the others to attempt to eliminate any bias that may have been imposed by the high density route. (Modified author abstract) (U)

AD- 762 034 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - Performance Assurance. (U)

MAY 73 33P
REPT. NO. FAA-ED-21-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MANAGEMENT PLANNING AND CONTROL), NAVIGATIONAL AIDS, RELIABILITY, MONITORS, MAINTENANCE (U)

The program plan describes the development activities that are being pursued to enhance overall performance assurance of all air traffic control and navigation facilities within the National Airspace System (NAS). The plan provides detailed information on the objectives, goals, program structure, technical approach, resources, and possible implementation, as well as, general discussions which emphasize the rationale and philosophy which dictates the course of action. This plan is indicated on the basic assumption that improvements and efficiencies in the current methods and concept of facility performance assurance are imperative in the face of continuing facility expansion, maintenance workforce freezes and economy drives. (Author) (U)

AD- 761 568 17/2.1 17/7
INSTITUTE FOR TELECOMMUNICATION SCIENCES BOULDER COLO

Compatibility Measurements of Digital MSK and Voice Transmissions. (U)

DESCRIPTIVE NOTE: Final rept. Apr 72-Apr 73,
APR 73 96P Juroshek,John R. ;
CONTRACT: DOT-FA72WAI-268
PROJ: FAA-063-231
MONITOR: FAA-RD 73-63

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMMUNICATION AND RADIO SYSTEMS, ELECTROMAGNETIC COMPATIBILITY), (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION AND RADIO SYSTEMS), DATA TRANSMISSION SYSTEMS, VOICE COMMUNICATIONS, RADIOFREQUENCY INTERFERENCE, DIGITAL SYSTEMS (U)

The following describes a series of experimental tests to measure interference between digital and voice systems. The digital system consisted of a 2400 bit-per-second, minimum-shift-keyed modem whose 1.2 and 2.4 kHz tones were transmitted by amplitude modulation. Measurements were made showing the effects of digital interference on voice transmission, voice interference on digital transmission, and digital interference on digital transmission. The tests were conducted at VHF using a commercial aircraft receiver. The report also describes an experiment to frequency multiplex the MSK signal for simultaneous transmission with voice. Circuitry was developed to frequency translate the 1.2 and 2.4 kHz tones of the digital system to 6.6 and 7.8 kHz, respectively. Measurements were then conducted to demonstrate feasibility. (Author) (U)

AD- 761 567 17/7 17/2
COMPUTER SCIENCES CORP FALLS CHURCH VA

FAA Communications System Description (1973). (U)

DESCRIPTIVE NOTE: Final rept. on Task 1, FEB 73 479P Hansen,John C. ;Boseck,E. M. ;Weber,R. ;Lorence,R. ;
CONTRACT: DOT-FA-72WA-3072
MONITOR: FAA-RD 73-36

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), NETWORKS, DATA TRANSMISSION SYSTEMS (U)
IDENTIFIERS: FEDERAL AVIATION ADMINISTRATION (U)

The report describes the current operational communications employed by the FAA in supporting the National Aviation System. The evolution of FAA communications is presented as well as a summary of the primary information transfer. Detailed descriptions of all the major communication systems and subsystems are included. The content of the report covers Air-Ground, Ground-Ground (voice) and Ground-Ground (Data) Communications. (Author) (U)

AD- 761 378 1/2 1/5
MITRE CORP MCLEAN VA

Quiet Short-Haul Air Transportation Terminal Area Scenarios and ATC Implications. (U)

DESCRIPTIVE NOTE: Final rept., MAY 73 39P Ditmore,M. A. ;
REPT. NO. MTR-6338-Vol-3
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-QS 73-3-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-761 377.
DESCRIPTORS: (*CIVIL AVIATION, TERMINAL FLIGHT FACILITIES), (*TERMINAL FLIGHT FACILITIES, SHORT TAKEOFF AIRCRAFT), RUNWAYS, AIR TRAFFIC CONTROL SYSTEMS, AIR TRANSPORTATION, AIRPORTS, COMMERCE, AIR TRAFFIC CONTROL TERMINAL AREAS, SPECIFICATIONS, VERTICAL TAKEOFF AIRCRAFT, REVIEWS, STANDARDS, URBAN AREAS, NEW YORK, CALIFORNIA (U)
IDENTIFIERS: *QUIET SHORT HAUL AIR TRANSPORTATION SYSTEMS, *SECONDARY AIRPORTS (U)

The document (Volume I of five volumes) is a proposed program plan for improvements in air traffic control and airports required as part of the FAA's Quiet Short-Haul Air Transportation System (QSATS) program. In accordance with guidance from the FAA QSATS Office, the document is in the format of a chapter for a National Plan to Improve Short-Haul Air Transportation. The document summarizes the conclusions and recommendations of several scenarios and case studies which were used to examine the ATC/Airport implications associated with various concepts as to how the improved short-haul air transportation service is most likely to evolve. The ATC/Airport Program Plan is based on the findings resulting from those scenarios; on assumptions as to the types of airports and aircraft most likely to be involved; and on assumptions as to the nature of the future ATC capabilities expected from the FAA ATC program as currently defined.

(U)

AD- 761 377 1/2 1/5
MITRE CORP MCLEAN VA

Quiet Short-Haul Air Transportation System ATC Requirements: Airport Scenarios. (U)

DESCRIPTIVE NOTE: Final rept., MAY 73 101P Mitchell,T. R. ;Smith,A. P. ;
REPT. NO. MTR-6338-Vol-2
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-QS 73-3-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-761 376 and AD-761 378.
DESCRIPTORS: (*CIVIL AVIATION, TERMINAL FLIGHT FACILITIES), (*TERMINAL FLIGHT FACILITIES, SHORT TAKEOFF AIRCRAFT), PLANNING, AIR TRAFFIC CONTROL SYSTEMS, PREDICTIONS, STANDARDS, SPECIFICATIONS, VERTICAL TAKEOFF AIRCRAFT, REVIEWS, URBAN AREAS, NEW YORK, CALIFORNIA (U)
IDENTIFIERS: SCENARIOS, *SECONDARY AIRPORTS (U)

The FAA Quiet Short-Haul Air Transportation System (QSATS) Office has asked The MITRE Corporation to prepare a QSATS Air Traffic Control (ATC) Program Plan, for consideration as part of a national short-haul air transportation system improvement plan. At the inception of the task, concepts of how future short-haul system improvement should evolve and estimates of the demand such improvement would foster, were still in the formative stage. However, it was agreed that the ATC implications of the QSATS program could be determined via a wide but realistic range of airport, terminal area and en route scenarios. Volume I of this report contains the QSATS ATC Program Plan which resulted. This volume, 2, presents the QSATS Airport ATC scenarios, and supports the airport aspects of the proposed ATC program plan. By definition, the Airport ATC scenarios are concerned with ATC facilities, rules and procedures necessary to move air traffic from the ILS gate to the terminal building passenger gate and vice versa. (Author) (U)

AD- 761 376 1/2 1/5
MITRE CORP MCLEAN VA

Quiet Short-Haul Air Transportation System Requirements: ATC/Airports Program Plan. (U)

DESCRIPTIVE NOTE: Final rept., MAY 73 72P Ditmore,M. A. ;Kay,M. E. ;Mitchell,T. R. ;Smith,A. P. ;
REPT. NO. MTR-6338-Vol-1
CONTRACT: DOT-FA69NS-162
MONITOR: FAA-QS 73-3-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-761 377.
DESCRIPTORS: (*CIVIL AVIATION, TERMINAL FLIGHT FACILITIES), (*TERMINAL FLIGHT FACILITIES, SHORT TAKEOFF AIRCRAFT), AIRPORTS, AIR TRAFFIC CONTROL SYSTEMS, AIR TRAFFIC CONTROL TERMINAL AREAS, AIR TRANSPORTATION, CARGO, VERTICAL TAKEOFF AIRCRAFT, STANDARDS, REVIEWS, URBAN AREAS, NEW YORK, CALIFORNIA (U)
IDENTIFIERS: *QUIET SHORT HAUL AIR TRANSPORTATION SYSTEMS, *SECONDARY AIRPORTS (U)

The report describes the analysis done to define the terminal area ATC implications of implementing improved short-haul air transportation in a complex metroplex area. As the short-haul system for the time period in question (1976-1980) is not yet defined in detail, figures as to demand and airports to be used were not available. In lieu of that information, a scenario appraoch was taken to determine the terminal area ATC implications of improving short-haul air transportation (through the use of future short-haul aircraft) using secondary airports, a central business district airport, and separate short-haul runways at one large hub airport. Situations were selected which would place stress on the terminal area ATC system and provide some insight as to the adequacy of present NASA/FAA programs. New York and Los Angeles were chosen as the metroplex areas to be examined. Hypothetical terminal area structures, based on both radar vectoring and area navigation, are described. (Modified author abstract) (U)

AD- 760 639 17/7
GEORGIA INST OF TECH ATLANTA COMMUNICATIONS DIV

Electronic Facility Bonding, Grounding and Shielding Review. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 72 121P Denny,H. W. ;Holder,F. P. ;Robinette,S. L. ;Toler,J. C. ;Woody, J. A. ;
CONTRACT: DOT-FA72WA-2850
MONITOR: FAA-RD 73-51

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RELIABILITY(ELECTRONICS)), ELECTRONIC EQUIPMENT, GROUND(ELECTRICAL), ELECTROMAGNETIC SHIELDING, BONDING, LIGHTNING ARRESTERS, STATE-OF-THE-ART REVIEWS, RADIOFREQUENCY INTERFERENCE, REDUCTION, ELECTROMAGNETIC COMPATIBILITY, SAFETY (U)

Air traffic control electronic facilities, earth grounding requirements are examined in terms of the needs for lightning protection. It is reviewed to determine the ground system requirements necessary to protect personnel, equipment, and facilities. A signal ground reference system is developed based on relative tradeoffs between interference reduction principles, implementation practicalities, and cost considerations. Equipment and facility shielding needs are reviewed from the perspectives of electromagnetic compatibility enhancement and personnel hazard prevention. Bonding techniques and practices are summarized with special emphasis placed on maintenance requirements. Finally, useful ground system maintenance test procedures are described and additional cost factors not emphasized elsewhere are discussed. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 760 256 17/7
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

A Computer Program for Calculating Flight Profiles of Concorde. (U)

DESCRIPTIVE NOTE: Technical rept.,
OCT 72 35P Mitchell,V. Hilary ;
REPT. NO. RAE-TR-72102
MONITOR: DRIC BR-32220

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUPERSONIC AIRCRAFT, *AIR TRAFFIC CONTROL SYSTEMS), SUPERSONIC FLIGHT, SUPERSONIC CHARACTERISTICS, FLIGHT PATHS, TURNING FLIGHT, AIRCRAFT LANDINGS, TAKEOFF, COMPUTER PROGRAMMING, GREAT BRITAIN (U)

A computer program which can calculate flight profiles of a Concorde for a variety of flight procedures and atmospheric conditions has been written. This Report describes the layout and capabilities of the program. It also gives detailed instructions for the preparation of its data which consists of a series of descriptive phrases. (U)

AD- 760 164 17/7
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT PARIS (FRANCE)

Air Traffic Control Systems. (U)

DESCRIPTIVE NOTE: Conference proceedings.
APR 73 378P
REPT. NO. AGARD-CP-105

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Papers presented at the Meeting of the Guidance and Control Panel of AGARD (14th), held in Edinburgh, Scotland, 26-29 June 1972. NATO furnished.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SYMPOSIA), TERMINAL FLIGHT FACILITIES, GROUND-CONTROLLED APPROACH RADAR, AIR TRAFFIC CONTROLLERS, DISTANCE MEASURING EQUIPMENT, RADAR BEACONS, MICROWAVE COMMUNICATIONS, HUMAN FACTORS ENGINEERING (U)
IDENTIFIERS: COLLISION AVOIDANCE (U)

The symposium was structured along the following main lines: control concepts, automation, area and en-route navigation, terminal navigation and control, landing guidance, surveillance, communications, collision avoidance, human aspects and, following a request of NATO Headquarters, a special session devoted to integrated communication, navigation and identification. (U)

AD- 759 864 17/7 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ATC Concepts for V/STOL Vehicles. Part 1. Downtown STOLport. Part 2. CSTOL/STOL Airport. (U)

DESCRIPTIVE NOTE: Final rept. Mar 71-Aug 72,
APR 73 67P Rossiter,Sidney B. ;Maurer, John ;O'Brien,Paul J. ;
REPT. NO. FAA-NA-72-95
PROJ: FAA-015-190
MONITOR: FAA-RD 73-47

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SHORT TAKEOFF AIRCRAFT), SIMULATION, OPERATION, AIRCRAFT LANDINGS, RUNWAYS, AIR TRAFFIC CONTROL TERMINAL AREAS (U)
IDENTIFIERS: STOLPORTS (U)

Two dynamic simulations were conducted, using saturated Short Takeoff and Landing (STOL) aircraft traffic sample inputs, to study the effects of various aspects of STOL aircraft operations within the Air Traffic Control System. One investigated the effects of STOL aircraft operating at a downtown STOLport within the New York terminal area complex; the other investigated the effect of STOL aircraft operating on various configurations of STOL runways at a high-density, multi-runway, conventional takeoff and landing (CTOL) airport. It was concluded that STOL operations can be accommodated at a downtown STOLport; however, where airspace is limited, intricate profiles requiring a high degree of aircraft performance may be required. The performance of these profiles should be an onboard responsibility using highly accurate area navigation equipments with the ATC facility serving as a monitor. (Author Modified Abstract) (U)

AD- 759 539 17/7 5/8
COLLINS RADIO CO CEDAR RAPIDS IOWA

Control-Display Testing Requirements Study. (U)

DESCRIPTIVE NOTE: Final rept. 24 Jan-24 Jul 72, DEC 72 182P Duning,Kenneth E. ;Hickok, Craig W. ;Emerson,Kenneth C. ;Clement,Warren F. ;
REPT. NO. 523-0764468-00111M
CONTRACT: F33615-72-C-1022
MONITOR: AFFDL TR-72-122

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Systems Technology, Inc., Princeton, N.J.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *MAN MACHINE SYSTEMS), INSTRUMENT LANDINGS, DISPLAY SYSTEMS, CONTROL SYSTEMS, PILOTS, PERFORMANCE(HUMAN), HUMAN FACTORS ENGINEERING (U)
IDENTIFIERS: LANDING AIDS, MICROWAVE EQUIPMENT (U)

Control-display problems in terminal area navigation and zero visibility landing are identified along with related considerations for control laws and computations and requirements for sensors. Test and development program plans for research, development, and testing of controls and displays for full use of the capabilities of the microwave landing system are presented. Criteria and measurements for development and testing controls and displays are discussed. Procedures for evaluation of system performance, pilot performance, pilot acceptance, and safety are included. Alternative techniques for measuring pilot workload are outlined. Coordinated use of theoretical analysis, simulation, and flight test for development and testing of control-display systems is discussed. (Author Modified Abstract) (U)

AD- 759 179 17/9 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A High Performance, Low Cost, Air Traffic Control Radar. (U)

DESCRIPTIVE NOTE: Technical note, FEB 73 44P Mueche,Charles E. , Jr.; Cartledge,Lincoln ;
REPT. NO. TN-1973-12
CONTRACT: F19628-73-C-0002
PROJ: AF-649L
MONITOR: ESD TR-73-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-757 939.
DESCRIPTORS: (*SEARCH RADAR, RELIABILITY(ELECTRONICS)), (*AIR TRAFFIC CONTROL SYSTEMS, *AIRPORT RADAR SYSTEMS), GROUND-CONTROLLED APPROACH RADAR, RADAR EQUIPMENT, RADAR CROSS SECTIONS, RADAR CLUTTER, DISPLAY SYSTEMS, TELEPHONE SYSTEMS, RADAR LANDING CONTROL, COSTS (U)
IDENTIFIERS: *SIGNAL PROCESSING (U)

Recent improvements in the technology of electronically switched antennas and digital signal processing make possible a relatively high performance, low cost, surveillance radar. The radar described employs an electronically step-scanned, cylindrical antenna together with an advanced digital signal processor to give superior MTI performance at an estimated cost of less than half the present S-band ASRs. The radar output consists of narrow band, digital target reports free of false alarms, suitable for transmission over telephone lines. Remote radar operation using digital, bright, scan-history displays becomes practical as does easy incorporation of beacon and direction finder outputs along with digitally generated video maps. The complete absence of moving parts, the low power transmitter and the largely solid-state construction will provide high reliability and low maintenance costs. (Author Modified Abstract) (U)

AD- 759 146 17/9 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Tests of the Vega Aircraft Radar Enhancing System (VARES). (U)

DESCRIPTIVE NOTE: Final Rept. Nov 71-Oct 72,
APR 73 51P Offi,Dominick L. ;
REPT. NO. FAA-NA-73-14
PROJ: FAA-022-241-030
MONITOR: FAA-RD 73-38

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR EQUIPMENT, FLIGHT TESTING), (*AIR TRAFFIC CONTROL SYSTEMS, *AIRPORT RADAR SYSTEMS), AIRCRAFT LANDINGS, TAKEOFF, PLAN POSITION INDICATORS, CIVIL AVIATION, RADAR CROSS SECTIONS, RADAR CLUTTER, RADAR BEACONS (U)

A cross-band radar/beacon system, designed to operate within the constraints of the Airport Surveillance Radar/Air Traffic Control Beacon Interrogator (ASR/ATCBI) environment was evaluated at the National Aviation Facilities Experimental Center (NAFEC). The equipment, known as the Vega Aircraft Radar Enhancing System (VARES) was tested to determine technical as well as operational characteristics. The VARES equipment, as originally designed, was not electrically nor mechanically compatible with the ASR/ATCBI system, nor with the aircraft available at NAFEC. With proper modifications, the system provided an increased radar detection capability. In addition, limited tests indicated evidence of possible interference with the ATC Beacon System. (Author) (U)

AD- 759 145 17/7
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER ANNAPOLIS MD

In-Band Compatibility Analysis of the RTCA-Proposed Microwave Landing Guidance System (LGS) and Candidate Interim Systems. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 72 231P Frazier,Robert A. ;
REPT. NO. ECAC-PR-72-069
CONTRACT: DOT-FA70WAI-175
MONITOR: FAA-RD 72-62

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, ELECTROMAGNETIC COMPATIBILITY), INSTRUMENT LANDINGS, MICROWAVE EQUIPMENT, DISTANCE MEASURING EQUIPMENT, GLIDE PATH SYSTEMS, RADIO EQUIPMENT, RADIO NAVIGATION (U)
IDENTIFIERS: LANDING AIDS, MICROWAVE EQUIPMENT (U)

The electromagnetic compatibility among the proposed RTCA SC-117 next generation microwave landing guidance system (LGS) and several existing microwave landing guidance systems proposed as interim system candidates was analyzed. The signal format for LGS was developed by Special Committee 117 of the Radio Technical Commission for Aeronautics. The angle data localizer and glideslope portions of the systems were deployed in an FAA-predicted high density 1980 environment and the possibility of compatible operation was assessed with the assistance of a computer analysis. The compatibility among the systems' DME functions was nalyzed using frequency/distance considerations. The EMC between the landing guidance systems and other in-band domestic systems and between the LGS and a foreign microwave enroute guidance satellite system (DIOSCURES) were analyzed using frequency/distance considerations. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 759 098 17/7 9/5
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Microwave Scanning Beam Approach and Landing System Phased Array Antenna. Volume II. (U)

DESCRIPTIVE NOTE: Annual rept. no. 2, Jul 71-Jun 72, FEB 73 205P Kalafus,R. M. ;Bishop,G. J. ;LaRussa,F. J. ;Pantano,P. J. ;Wade, W. R. ;
REPT. NO. TSC-FAA-72-41-Vol-2
CONTRACT: FA-209
MONITOR: FAA-RD 72-128-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-759 097.
DESCRIPTORS: (*PHASED ARRAYS, RELIABILITY(ELECTRONICS)), (*LANDING AIDS, PHASED ARRAYS), (*AIR TRAFFIC CONTROL SYSTEMS, *MICROWAVE EQUIPMENT), GLIDE PATH SYSTEMS, ANTENNA COMPONENTS, C BAND, PHASE SHIFT CIRCUITS, POWER DIVIDERS, RADIOFREQUENCY LENSES, SPECIFICATIONS (U)
IDENTIFIERS: *LANDING AIDS, *MICROWAVE EQUIPMENT (U)

;Contents: Evaluation of an R-2R lens as a component in a C-Band phased array; Azimuth component specifications and test results; Elevation component specifications. (U)

AD- 759 098 UNCLASSIFIED

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 759 097 17/7 9/5
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Microwave Scanning Beam Approach and Landing System Phased Array Antenna. Volume I. (U)

DESCRIPTIVE NOTE: Annual rept. no. 2, Jul 71-Jun 72, FEB 73 241P Kalafus,R. M. ;Bishop,G. J. ;LaRussa,F. J. ;Pantano,P. J. ;Wade, W. R. ;
REPT. NO. TSC-FAA-72-41-Vol-1
CONTRACT: FA-209
MONITOR: FAA-RD 72-128-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-759 098.
DESCRIPTORS: (*PHASED ARRAYS, RELIABILITY(ELECTRONICS)), (*LANDING AIDS, PHASED ARRAYS), (*AIR TRAFFIC CONTROL SYSTEMS, *MICROWAVE EQUIPMENT), GLIDE PATH SYSTEMS, ANTENNA COMPONENTS, C BAND, PHASE SHIFT CIRCUITS, POWER DIVIDERS, RADIOFREQUENCY LENSES, ANTENNA RADIATION PATTERNS, SPECIFICATIONS (U)
IDENTIFIERS: *LANDING AIDS, *MICROWAVE EQUIPMENT (U)

The use of phased arrays for the proposed landing system (MLS) is discussed. Studies relating to ground reflections, near field focusing, and phased-array errors are presented. Two experimental antennas which were fabricated and tested are described. Complete component specifications as well as test results are included. (Author Modified Abstract) (U)

AD- 759 097 UNCLASSIFIED Z0M08

AD- 759 022 5/9
NAVAL PERSONNEL RESEARCH AND DEVELOPMENT LAB WASHINGTON D C

Occupational Analysis: Report of Analysis of Data from Field Test of Air Controlman Rating. (U)

APR 73 69P Cullison,Maurice D. ;
REPT. NO. WTR-73-16
PROJ: TDP-P43.07X.A1.31W

UNCLASSIFIED REPORT

DESCRIPTORS: (*JOB ANALYSIS, *NAVAL PERSONNEL), (*AIR TRAFFIC CONTROLLERS, JOB ANALYSIS), NAVAL TRAINING, RADAR EQUIPMENT, FEMALES (U)

A study was made of specific subject areas of the Air Controlman (AC) rating. Particular attention was devoted to such subjects as the commonality of NEC tasks, utilization of equipment, performance of women in the rating, and training and curricula modification. Tasks performed by different groups of ACs were compared to determine the areas of overlap and similarity. Conclusions were made that work performance of ACs was functionally oriented without specific regard to special training received or NECs awarded. 'Core' training and specific 'phase' training were recommended for intermediate and advanced type radar courses on a 'modular' basis, as dictated by the needs of the fleet. More 'personalization' and 'individualization' were recommended for improving training curricula. (Author) (U)

AD- 758 903 15/7
MODERN ARMY SELECTED SYSTEMS TEST EVALUATION AND REVIEW FORT HOOD TEX

Army Airspace Control Program of Evaluation Report. (U)

DESCRIPTIVE NOTE: Final rept. 19 Jun 72-2 Feb 73,
APR 73 223P DeLany,Daniel J. ;Powell, Benjamin B. ;Boothe,Robert S. ;McKee,David L. ;Brown,Thomas M. ;
PROJ: MASSTER-Test-152

UNCLASSIFIED REPORT

DESCRIPTORS: (*ARMY OPERATIONS, *AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC CONTROL SYSTEMS, ANTIAIRCRAFT GUNS, CLOSE SUPPORT, ARTILLERY, COMMUNICATIONS CENTRAL, ARMY OPERATIONS, WAR GAMES, INTERCEPTION PROBABILITIE (U)
IDENTIFIERS: AIRSPACE CONTROL (U)

The purpose of the Army Airspace Control Program of Evaluation was to evaluate Army doctrine, procedures, and organization for controlling airspace and to identify materiel needed to implement the system. The program of evaluation was conducted as four separate, but interrelated, activities which overlapped in time: A background and materiel review; a two-sided, computer assisted, time step war game; a one-sided, computer assisted, command post exercise; and a day-long conference of general officers representing the Combat Arms Centers, United States Army Combat Developments Command, and Headquarters, MASSTER. (Author) (U)

AD- 758 886 17/9 17/7
SPERRY RAND CORP ST PAUL MINN UNIVAC DEFENSE SYSTEMS DIV

ARTS-III Augmented Tracking Study. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 72 275P Wold,M. ;Kelly,G. ;
Birkholz,B. ;Smulowicz,B. ;Sittler,R. ;
REPT. NO. PX-6392-F
CONTRACT: DOT-FA70WA-2289
PROJ: FAA-19180
MONITOR: FAA-RD 73-27

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with ARCON Corp.
DESCRIPTORS: (*LANDING AIDS, *RADAR TRACKING), (*CIVIL AVIATION, *TERMINAL FLIGHT FACILITIES), AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS, GROUND-CONTROLLED APPROACH RADAR, RADAR CROSS SECTIONS, RADAR CLUTTER, MATHEMATICAL MODELS, ALGORITHMS (U)

The report is compiled from the results obtained during investigation of methods for improving aircraft tracking techniques within the ARTS-III system. This study recognizes the current tracking level of the Basic Radar Beacon Tracking Level (RBTL) System as the starting point for development. At this level, both radar and beacon target reports from a common sensor site are available for tracking. The work described by this report is an investigation of new methods for utilizing these target reports as well as optimizing and refining existing methods. (Author Modified Abstract) (U)

AD- 758 786 17/7
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO

Analysis of Data Rate Requirements for Low Visibility Approach with a Scanning Beam Landing Guidance System. (U)

DESCRIPTIVE NOTE: Technical rept. Aug 69-1 Jul 72,
FEB 73 172P Dillow,James D. ;Stolz,
Paul R. ;Zuckerman,Meyer D. ;
REPT. NO. AFFDL-TR-71-177
PROJ: AF-8219
TASK: 821911

UNCLASSIFIED REPORT

DESCRIPTORS: (*GLIDE PATH SYSTEMS, *RADAR SCANNING), (*TERMINAL FLIGHT FACILITIES, *RADAR LANDING CONTROL), AIR TRAFFIC CONTROL SYSTEMS, FLIGHT CONTROL SYSTEMS, INSTRUMENT LANDINGS, GUST LOADS, EQUATIONS OF MOTION, MATHEMATICAL MODELS, OPTIMIZATION (U)
IDENTIFIERS: COMPUTER AIDED ANALYSIS, DIGITAL SIMULATION (U)

Data rate requirements for low visibility approach with a simple data measurement of glideslope deviation are investigated analytically. A 'window' is defined by specifying certain allowable deviations in the aircraft motion variables which are acceptable for continuation of the landing at a 100-ft-decision altitude. The approach performance is defined as the probability of missing the window, which corresponds to the probability of a missed approach. The landing approach process is modeled by a system of stochastic differential equations, which account for the aircraft dynamics, atmospheric disturbances, guidance errors, and data rate. The flight control system is modeled by a state estimator and a state feedback matrix which is optimized so as to minimize the probability of a missed approach subject to rms constraints on control activity. (Author Modified Abstract) (U)

AD- 758 699 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Controller-Reported Performance Defects in the Air Traffic Control Radar Beacon System (1971 Survey). (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 73 199P Rubinger,Bruce ;
REPT. NO. TSC-FAA-72-40
CONTRACT: FA-319
MONITOR: FAA-RD 73-16

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR BEACONS, RELIABILITY), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), RADAR CROSS SECTIONS, RADAR INTERFERENCE, ERRORS, FAILURE, CIVIL AVIATION, STATISTICAL DATA (U)

The report analyzes the returns from a recent ATC performance survey initiated by the Beacon System Interference Problem Subgroup. The survey began on 27 November 1971 and lasted for two weeks. Participation was limited to 37 facilities with problems considered representative of the entire system; included were enroute centers, civilian towers and military air traffic installations. Examination of the deficiency data revealed that the most common nationwide problem was the loss of beacon coverage for a short period of time. This is followed by broken target slash, ring around, loss of coverage for long time, and false targets. The returns are sorted to identify the type of aircraft involved in the reported discrepancies. (Author Modified Abstract) (U)

AD- 758 697 17/7 9/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Advanced Computer Architecture for Large-Scale Real-Time Applications. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 73 184P Wang,Gary Y. ;
REPT. NO. TSC-FAA-72-21
CONTRACT: FA-203
MONITOR: FAA-RD 72-101

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), (*DATA PROCESSING, AIR TRAFFIC CONTROL SYSTEMS), REAL TIME, TARGET ACQUISITION, RADAR TRACKING, COMPUTER LOGIC, DATA STORAGE SYSTEMS, SCHEDULING, COMPUTER PROGRAMS (U)
IDENTIFIERS: MULTIPROCESSING, PARALLEL PROCESSORS, ASSOCIATIVE STORAGE, SIMULATION LANGUAGES, FORTRAN (U)

Air traffic control automation is identified as a crucial problem which provides a complex, real-time computer application environment. A novel computer architecture in the form of a pipeline associative processor is conceived to achieve greater performance improvement over the present air traffic control system by parallel processing. This new processor is structured into a multiprocessor configuration for reliability enhancement. Problems associated with multiprocessors are identified with special emphasis on execution time anomalies and memory conflict. A direct graph model is used for analysis from which simple heuristics are established for memory allocation and dynamic task scheduling to achieve optimal performance with minimal system overhead. These schemes are simulated and the results obtained follow closely the predicted system behavior. The report includes a discussion of the GASP II simulation programming language, and the FORTRAN H-516 simulation program listings for analysis of the proposed processor. (Author) (U)

AD- 758 407 17/7 17/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Signal Analysis for Aerosat. (U)

DESCRIPTIVE NOTE: Final rept. Jan-Jun 72,
AUG 72 78P Frasco,L. A. ;
REPT. NO. DOT-TSC-FAA-72-29
MONITOR: FAA-RD 73-34

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION SATELLITES(ACTIVE)), DATA TRANSMISSION SYSTEMS, MODULATORS, DEMODULATORS, SYSTEMS ENGINEERING, TRANSMITTER RECEIVERS, L BAND, MULTIPATH TRANSMISSION, RADIO RELAY SYSTEMS, POSITION FINDING (U)
IDENTIFIERS: *MODEMS, AVIONICS (U)

The report addresses signal design for the AEROSAT system. Candidate data and surveillance modems are analyzed for L-Band avionics. Detailed theoretical analyses are presented of the effects of the oceanic satellite-aircraft channel on data modem performance. In addition, an L Band avionics transceiver is proposed to meet the requirements of the Experimentation and Evaluation Phase of AEROSAT. The proposed avionics is flexible and easily adaptable to a variety of operational and access control concepts. A task plan outline is presented for an improved modem task for the following year. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 758 284 17/7
VIRGINIA RESEARCH INC ARLINGTON

An Overview of the Federal Aviation Administration Engineering and Development Programs, Fiscal Years 1973 and 1974. (U)

MAR 73 64P
CONTRACT: DOT-FA73WA-3240
MONITOR: FAA-EM 73-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *REVIEWS), RUNWAYS, CONCRETE, SHORT TAKEOFF AIRCRAFT, RADAR EQUIPMENT, NAVIGATION, DATA PROCESSING, AVIATION SAFETY, AIRCRAFT NOISE (U)
IDENTIFIERS: QUIET SHORT HAUL AIR TRANSPORTATION SYSTEMS (U)

The document provides a descriptive overview of the FAA's engineering and development programs, indicating long-term directions and highlighting progress during FY 1973 and expected achievements during FY 1974. Most of the programs are directly related to obtaining improved air traffic control systems and subsystems. The programs include such diverse projects as the use of satellites for air traffic control oceanic communications, improved concrete for runways, and the Quiet Short-haul Air Transportation System (QSATS). Technology areas addressed in the program include radar, navigation, communications, automatic data processing, weather prediction and data processing, anti-hijacking devices, aircraft safety, and noise abatement. (Author) (U)

AD- 758 271 17/7
BENDIX CORP BALTIMORE MD COMMUNICATIONS DIV

Synchronized Discrete Address Beacon System (Synchro-DABS). (U)

DESCRIPTIVE NOTE: Final rept. 31 Mar 72-8 Jan 73, JAN 73 384P McComas,A. D. ;Kessler, J. A. ;Ransom,J. R. ;Shear,W. G. ; Kuntman,D. ;
REPT. NO. SD-FR-01
CONTRACT: DOT-FA72WA-2888
MONITOR: FAA-EM 73-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), SYNCHRONIZATION(ELECTRONICS), DATA TRANSMISSION SYSTEMS, SYSTEMS ENGINEERING, AIRCRAFT EQUIPMENT, TRANSPONDERS, COSTS, INTEGRATED SYSTEMS (U)
IDENTIFIERS: DABS(DISCRETE ADDRESS BEACON SYSTEM), DISCRETE ADDRESS BEACON SYSTEMS (U)

The report describes the results of a study to determine the problems, benefits, and costs of synchronizing the DABS system such as to provide each airborne participant with certain optional aeronautical services. A system concept is developed and documented to the extent necessary to establish a basis for estimating the costs of representitive avionics options. The costs and technical descriptions of 12 configurations are developed to various degrees, beginning with a basic DABS transponder with IPC and progressing through ATC Data Link, PWI, CAS, DME and cockpit PPI displays. (Author) (U)

AD- 758 240 17/7
SYSTEMS CONTROL INC PALO ALTO CALIF

Oceanic ATC Surveillance Systems Study. (U)

DESCRIPTIVE NOTE: Final rept. Jun 71-Jan 73. FEB 73 211P
CONTRACT: DOT-TSC-260
PROJ: FAA-043-311
MONITOR: FAA-RD 73-8

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AVIATION SAFETY), MATHEMATICAL MODELS, PROBABILITY, INERTIAL NAVIGATION, POSITION FINDING, ATLANTIC OCEAN (U)
IDENTIFIERS: NORTH ATLANTIC OCEAN, SENSITIVITY ANALYSIS (U)

The report presents a general approach for modeling the interaction of the major elements of the Oceanic Atc System: the onboard navigation system, the surveillance system and the ATC procedures. This modeling approach includes the time/position dependence in the description of the navigation drift error and the surveillance positioning error and includes the return maneuvers of aircraft receiving surveillance alarms. In addition, both strategic and tactical control strategies are considered. (Author Modified Abstract) (U)

AD- 757 933 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Attrition-Retention Rates of Air Traffic Control Trainees Recruited during 1960-1963 and 1968-1970, (U)

NOV 72 34P Cobb,Bart B. ;Mathews,John J. ;Nelson,Peter L. ;
MONITOR: FAA-AM 72-33

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, TRAINING), (*STUDENTS, ATTRITION), CIVIL AVIATION, PERSONNEL MANAGEMENT, STATISTICAL DATA, REVIEWS, RECRUITING, APTITUDE TESTS, MATHEMATICAL PREDICTION (U)
IDENTIFIERS: *PERSONNEL, *RETENTION(GENERAL) (U)

The study involved a total of 6,367 subjects in three ATCS options. Of these, 2,000 entered FAA Academy training during 1960 to 1963, before an ATC-Aptitude Test Battery became operational in the screening of most applicants. The remaining 4,367 subjects, the majority of whom were selected from among aptitude-screened applicants, entered the Academy's basic training courses during October 1968 through March 1970. Percentages reflecting Academy elimination rates are reported for entrants of the earlier and later time periods. (Author Modified Abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 757 805 17/7 1/2
STANFORD RESEARCH INST MENLO PARK CALIF

Computer-Aided Traffic/Airway/VOR (TAC) Network Methodologies. Part 2. Techniques of VORTAC Grid Design (Task 4). (U)

DESCRIPTIVE NOTE: Final rept. 19 Feb 71-31 Aug 72,
AUG 72 85P Siddiqee,Waheed ;Stoltz,Paul G. ;
CONTRACT: DOT-FA71WA-2547
PROJ: SRI-1096
MONITOR: FAA-RD 72-118-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-757 804.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, NETWORKS), (*RADIO NAVIGATION, NETWORKS), DESIGN, HIGH ALTITUDE, COSTS, RADIO BEACONS, MATHEMATICAL MODELS (U)
IDENTIFIERS: VOR, AIR ROUTES, COMPUTER AIDED DESIGN (U)

The objective of the task was the development of a systematic methodology and associated computer programs for the optimal design of a national grid of high-altitude VOR/VORTAC facilities. The report presents various techniques, models, and associated computer programs developed. (U)

AD- 757 804 17/7 1/2
STANFORD RESEARCH INST MENLO PARK CALIF

Computer-Aided Traffic/Airway/VOR(TAC) Network Methodologies. Part 1. Techniques of Air Route Network Design (Tasks 1, 2 and 3). (U)

DESCRIPTIVE NOTE: Final rept. 19 Feb 71-31 Aug 72,
AUG 72 130P Siddiqee,Waheed ;
CONTRACT: DOT - FA71WA-2547
PROJ: SRI-1096
MONITOR: FAA-R 72-118-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-757 805.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, NETWORKS), HIGH ALTITUDE, MATHEMATICAL MODELS, RADIO NAVIGATION, AIR TRAFFIC (U)
IDENTIFIERS: VOR, *AIR ROUTES, COMPUTER AIDED DESIGN (U)

The objectives were the development of a systematic methodology and associated computer programs for the optimal design of a national network of high-altitude RNAV air routes. The report presents various techniques, models, and associated computer programs. (Author Modified Abstract) (U)

AD- 757 803 17/7
MITRE CORP MCLEAN VA

Controller Productivity Study. (U)

DESCRIPTIVE NOTE: Technical rept.,
FEB 73 130P Rucker,R. A. ;Parlow,R. D. ;Sterfels,P. R. ;Mayer,D. S. ;
REPT. NO. MTR-6110
CONTRACT: DOT-FA70WA-2488
MONITOR: FAA-EM 73-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), (*PERSONNEL MANAGEMENT, AIR TRAFFIC CONTROL SYSTEMS), PRODUCTION, AIR TRAFFIC CONTROLLERS, PREDICTIONS (U)

The paper documents the results of a study conducted to estimate the effects of automation on the productivity of the air traffic control and flight services staffs over the next 10 to 20 years. The study concludes that an aggregate 5% per year productivity gain is achievable. Its realization will be dependent upon an aggressive development and implementation program for which the objective of achieving productivity gains is held firmly in view. (Author) (U)

AD- 757 477 9/2 17/7
SPERRY RAND CORP ST PAUL MINN UNIVAC DEFENSE SYSTEMS DIV

Knoxville Associative Processor Evaluation. (U)

DESCRIPTIVE NOTE: Final evaluation rept., NOV 72 326P Dietzler,B. G. ;
REPT. NO. PX-6406-Rev-A
CONTRACT: DOT-FA70WA-2289
MONITOR: FAA-RD 73-17

UNCLASSIFIED REPORT

DESCRIPTORS: (*DATA PROCESSING, *AIR TRAFFIC CONTROL SYSTEMS), COMPUTER PROGRAMMING, CONTROL SEQUENCES, REAL TIME, RADAR TRACKING, DETECTION, ALGORITHMS, TENNESSE(U)
IDENTIFIERS: ASSOCIATIVE PROCESSORS, UNIVAC 1230 COMPUTERS, EVALUATION (U)

The document contains an evaluation of the Goodyear Aerospace Associative Processor in performance of the tracking and conflict detection functions in a real-time ATC environment. The AP evaluation effort was performed at Knoxville, Tennessee, with Univac as the prime contractor to the FAA and with Goodyear Aerospace and Lambda as sub-contractors to Univac. (Author) (U)

AD- 757 274 17/7 1/2
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Oceanic Surveillance and Navigation Analysis, FY 72. (U)

DESCRIPTIVE NOTE: Final rept., AUG 72 76P Gagne,Gilbert A. ; Hershkowitz,Ronald M. ;
REPT. NO. TSC-FAA-72-26
MONITOR: FAA-RD 72-142

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-733 758.
DESCRIPTORS: (*INERTIAL NAVIGATION, CIVIL AVIATION), (*AVIATION SAFETY, AIR TRAFFIC), (*AIR TRAFFIC CONTROL SYSTEMS, ATLANTIC OCEAN), AVIATION ACCIDENTS, FLIGHT PATHS, SEPARATION, MODELS(SIMULATIONS), STANDARDS (U)

The report summarizes the Oceanic Surveillance and Navigation Analysis performed, at or under the direction of, the Transportation Systems Center under PPA FA-204 for FY72. A methodology has been developed by Systems Control, Inc. for relating the safety (collision risk) of the North Atlantic Organized Track System in the lateral dimension to the general characteristics of the on-board navigation system, the independent satellite surveillance system and the ATC procedures. The initiation of this effort by TSC was reported in TR DOT-TSC-FAA-71-13. The analysis and results are detailed herein. Extensions of this methodology to the latitude and vertical dimensions are also discussed and preliminary results are presented. A study has also been initiated to investigate and evaluate various configurations of aided inertial navigation system in the NAT region. The requirements, goals and contract award for the study are reviewed. (Author) (U)

AD- 757 089 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

A Functional Description of Air Traffic Control. (U)

DESCRIPTIVE NOTE: Technical note,
APR 71 89P Coonan,J. R. ;Mpontsikaris, P. ;
REPT. NO. TSC-FAA-71-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Service Technology Corp., Cambridge, Mass.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *JOB ANALYSIS), (*SYSTEMS ENGINEERING AIR TRAFFIC CONTROL SYSTEMS), OPERATION (U)

The document contains a description of air traffic control in terms of generic operational functions. The functions are grouped by flight phase and by major system function (navigation, surveillance, control and communication). More detailed descriptions of these functions, and estimates of related parameters are contained in the appendix. A diagram is shown of the sequence of events for a typical IFR flight through the current ATC system. Also, certain aspects of ATC which cannot be described in terms of operational functions (e.g., legal responsibilities) are discussed. (Author) (U)

AD- 757 052 17/7 1/5 9/3 14/2
NORTH AMERICAN SYSTEMS CORP LONDONDERRY N H

Infrared Inspection of Air Route Traffic Control Center (ARTCC) Electrical Equipment. (U)

DESCRIPTIVE NOTE: Final rept. Apr-Oct 72 on Phase 1,
OCT 72 66P Hall,Roger L. ;Lutze, Raymond J. ;
REPT. NO. C-208
CONTRACT: DOT-FA72WA-2908
MONITOR: FAA-RD 72-55

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MAINTENANCE), (*ELECTRICAL EQUIPMENT, NONDESTRUCTIVE TESTING), INFRARED RADIATION, RELIABILITY(ELECTRONICS), COST EFFECTIVENESS (U)
IDENTIFIERS: PREVENTIVE MAINTENANCE (U)

The electrical equipment at two ARTCC's was surveyed and current maintenance procedures reviewed to evaluate the applicability of IR inspection as a preventative maintenance tool. (Author) (U)

AD- 756 844 9/4 17/7 17/9
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Maximum-Likelihood Multiple-Hypothesis Testing Algorithm, with an Application to Monopulse Data Editing. (U)

DESCRIPTIVE NOTE: Technical note,
FEB 73 10P Kelly,E. J. ;
REPT. NO. TN-1973-7
CONTRACT: F19628-73-C-0002, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: ESD TR-73-66

UNCLASSIFIED REPORT

DESCRIPTORS: (*INFORMATION THEORY, STATISTICAL ANALYSIS), (*AIR TRAFFIC CONTROL SYSTEMS, *MONOPULSE RADAR), DECISION THEORY, SAMPLING, ANTENNA LOBES, RADIOFREQUENCY INTERFERENCE, NOISE, MATHEMATICAL MODE(U)
IDENTIFIERS: MAXIMUM LIKELIHOOD ESTIMATION, SIGNAL PROCESSING, HYPOTHESIS TESTING (U)

A simple algorithm for multiple-hypothesis testing, based on a generalization of likelihood ratio testing between pairs of hypotheses, is developed and applied to a specific problem. The problem arises in connection with an amplitude comparison monopulse system in an air traffic control application. In particular, it is desired to measure target azimuth in a beacon system in the presence of interference and multipath. The multiple hypotheses relate to the presence or absence of a desired signal, with or without either of two kinds of interfering signal. The analysis leads to a new technique of data editing, or processing, to detect the presence of interference. (Author) (U)

AD- 756 843 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

The Use of Supplementary Receivers for Enhanced Positional Accuracy in the DAB System. (U)

DESCRIPTIVE NOTE: Technical note,
DEC 72 87P Kelly,E. J. ;
REPT. NO. TN-1972-38
CONTRACT: F19628-70-C-0230, DOT-FA72WAI-261
PROJ: FAA-034-241-012
MONITOR: ESD TR-72-381

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIO BEACONS, *POSITION FINDING), (*AIR TRAFFIC CONTROL SYSTEMS, RADIO BEACONS), TRANSPONDERS, DETECTORS, ACCURACY, LEAST SQUARES METHOD, NUMERICAL ANALYSIS (U)
IDENTIFIERS: MULTILATERATION, DABS(DISCRETE ADDRESS BEACON SYSTEM) (U)

The report is an analysis of the performance of two general schemes which might be used to obtain enhanced accuracy of aircraft position determination in the DAB system. Both schemes use supplementary receivers to detect DABS replies, permitting multilateration or hyperbolic position finding, while differing in the way bistatic path lengths are measured. Detailed derivations and theoretical numerical results are presented. (Author) (U)

AD- 756 346 17/7 17/9
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - Air Traffic Control Surveillance Radar. (U)

DEC 72 64P Moses,Harry C. ;
MONITOR: FAA-ED 02-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SEARCH RADAR), COMMERCIAL PLANES, AVIATION SAFETY, RADAR STATIONS, RADAR CROSS SECTIONS, METEOROLOGICAL RADAR, TRANSPONDERS, PLANNING (U)
IDENTIFIERS: GROUND CLUTTER (U)

Although the air traffic control beacon system is rapidly growing in usage, and a vigorous development program to resolve performance limitations is in progress, the need for a primary radar surveillance system to be fully operational over the next decade clearly exists. This document discusses the role of the primary radar system, its performance deficiencies, and technical development programs to be undertaken during this time period, to assure that the total air traffic control surveillance requirements will be met. (Author) (U)

AD- 755 960 1/2
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

A Comprehensive Airport Communications System (CACS) Feasibility Study. (U)

DESCRIPTIVE NOTE: Technical rept.,
NOV 72 89P Smith,M. E. ;
REPT. NO. RAE-TR-72133
MONITOR: DRIC BR-32578

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *DATA TRANSMISSION SYSTEMS), (*CIVIL AVIATION, GREAT BRITAIN), COMMUNICATION SYSTEMS, TERMINAL FLIGHT FACILITIES, AIR TRAFFIC CONTROL TERMINAL AREAS, AIR TRAFFIC CONTROLLERS, SCHEDULING, DISPLAY SYSTEMS, COMPUTER PROGRAMMING (U)
IDENTIFIERS: FLIGHT PLANS (U)

A survey has been conducted of the need for computer-based data communications and/or processing facilities at a major civil airport. This survey has revealed an imbalance in the current development of such facilities within civil aviation which is to the detriment of the airport and which, if not redressed, will limit the advantage to be derived from those facilities already in operation or under development. A proposal is made for a system comprising data communication and processing facilities that is intended to enable the airport to participate fully in future developments of civil aviation automation. The proposal is made in varying depth for the various aspects of the overall system: greatest consideration having been given to the requirements of the airport ATC where the need for improved communications is thought to be the most pressing. (Author) (U)

AD- 755 940 1/2 17/7 17/2.1
CORNELL AERONAUTICAL LAB INC BUFFALO N Y

Investigations of Microwave Landing System Conventional and Doppler Scanning Beam Techniques. (U)

DESCRIPTIVE NOTE: Final rept. Jun 71-Sep 72,
SEP 72 182P Beneke,J. ;Wightman,C. W. ;Bergen,H. D. ;Kassel,C. E. ;
REPT. NO. CAL-AG-5011-B-1
CONTRACT: DOT-FA71WA-2592
MONITOR: FAA-RD 72-124

UNCLASSIFIED REPORT

DESCRIPTORS: (*DOPPLER NAVIGATION, MICROWAVE EQUIPMENT), (*TERMINAL FLIGHT FACILITIES, *AIR TRAFFIC CONTROL SYSTEMS), MULTIPATH TRANSMISSION, INSTRUMENT LANDINGS, FREQUENCY MODULATION, PULSE CODE MODULATION, DISTANCE MEASURING EQUIPMENT, AUTOMATIC GAIN CONTROL, MICROWAVE EQUIPMENT (U)
IDENTIFIERS: LANDING AIDS, MICROWAVE EQUIPMENT (U)

The report summarizes the results of analytical and experimental investigations carried out in support of the Microwave Landing System (MLS) program of the Federal Aviation Administration. The experimental program consisted of a simulation of the MLS signals that would be received in an aircraft. The systems simulated included conventional scanning beams with frequency and pulse angle coding, step-scan beams with frequency and time interval coding and the doppler scan technique. Angle measurement errors were determined for a wide range of signal parameters. Errors were measured in the presence of a single multipath of variable characteristics. Conclusions were drawn concerning the capability of the several signal formats to meet criteria accuracy requirements. The need for special processing techniques to reduce the effects of multipath is discussed. (Author) (U)

AD- 755 646 17/7 20/14
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER ANNAPOLIS MD

Air Traffic Control System Interference Considerations. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 72 54P Tabor,F. ;Shields,J. ;
CONTRACT: DOT-FA70WAI-175
MONITOR: FAA-RD 72-20

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADIOFREQUENCY INTERFERENCE), VERY HIGH FREQUENCY, ELECTROMAGNETIC COMPATIBILITY, COMPUTER PROGRAMS (U)

The FAA Air Traffic Control Navigation/ Communications system is examined to identify areas within the system that are particularly susceptible to radio frequency interference effects. The identified areas are investigated in the light of known past and present analyses, and recommendations for further studies are made. The report concludes that the cosite aspects of the FAAVHF Communications system requires further study in order to derive a practical means for achieving electromagnetic compatibility in the future. (Author) (U)

AD- 755 544 17/7
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER ANNAPOLIS MD

ATCRBS (Air Traffic Control Radar Beacon System) Performance Analysis for New York Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 72 50P Gettier,Charles A. ;
REPT. NO. ECAC-PR-72-031
CONTRACT: DOT-FA70WAI-175
MONITOR: FAA-RD 72-35

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), NEW YORK, PERFORMANCE(ENGINEERING), IDENTIFICATION SYSTEMS, TRANSPONDERS, RADAR EQUIPMENT(U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

This is one of a series of studies evaluating the occurrence of excessive interrogation signals ('hot spots') within air traffic control sectors supervised by the Air Traffic Control Beacon System (ATCRBS) of the Federal Aviation Administration. On-site observations of air traffic displays are discussed, and the analyses of the air traffic electromagnetic environments using performance prediction model techniques are described. (Author) (U)

AD- 754 932 17/7
MITRE CORP BEDFORD MASS

The Current Civil/Military ATC (Air Traffic Control) Interface. (U)

DESCRIPTIVE NOTE: Technical rept.,
DEC 72 102P Engel,H. E. ;
REPT. NO. MTR-2372
CONTRACT: F19628-73-C-0001
PROJ: AF-691A
MONITOR: ESD TR-72-334

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, INTERFACES), MANAGEMENT ENGINEERING, CIVIL AVIATION, MILITARY REQUIREMENTS, OPERATION (U)

Interfaces between military and civilian users of the airspace are shown to exist in four major areas: agreements, operations, organization and equipment. The interfaces permit safe operation of civilian aircraft in the common ATC system and allow operation of military aircraft in both the common system and within the requirements of special military command/control systems. The paper does a detailed examination of these four areas. The paper concludes with an examination of current trends in ATC system concepts. (Author) (U)

AD- 754 892 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Microwave Landing System Signal Requirements for Conventional Aircraft. (U)

DESCRIPTIVE NOTE: Final rept. 1971-72,
JUL 72 140P Lanman,Maurice H. , III;
REPT. NO. TSC-FAA-72-30
CONTRACT: FA-209
MONITOR: FAA-RD 72-86

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, INSTRUMENT LANDINGS), ALL WEATHER AVIATION, LANDING AIDS, AUTOMATIC, MATHEMATICAL MODELS, OPTIMIZATION, JET AIRCRAFT (U)
IDENTIFIERS: *LANDING AIDS, *MICROWAVE EQUIPMENT (U)

The results of analysis directed towards determining Microwave Landing System (MLS) signal requirements for conventional aircraft are discussed. The phases of flight considered include straight-in final approach, flareout, and rollout. A limited number of detailed problems in performance analysis are studied. Data from computer simulation, covariance propagation and system optimization, with a careful selection of variables provides a means for generalizing from the results of specific experiments to more comprehensive functional, data rate, beam noise, and control system requirements for automatic landing in turbulence. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMO8

AD- 754 272 17/7
IIT RESEARCH INST ANNAPOLIS MD

Air Traffic Control Radar Beacon System (ATCRBS) Performance Analysis - Kansas City Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 72 29P Ware,Maximilian , Jr;
CONTRACT: F19628-73-C-0031, DOT-FA70WAI-175
PROJ: FAA-213-503-015
MONITOR: ECAC,FAA-RD PR-72-023,72-37

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), PERFORMANCE(ENGINEERING), KANSAS, DISPLAY SYSTEMS, ELECTROMAGNETIC COMPATIBILITY, RADAR EQUIPMENT, IDENTIFICATION SYSTEMS, TRANSPONDERS (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

On-site observations of air traffic displays are discussed and the analyses of the air traffic displays are discussed and the analyses of the air traffic electromagnetic environments using performance prediction model techniques are described. Each of the studies evaluates the possibility of hot spots affecting one of the following ATCRBS Air Route Traffic Control Centers: Jacksonville, Washington, New York, Kansas City, and Los Angeles. (Author) (U)

AD- 754 266 17/7
IIT RESEARCH INST ANNAPOLIS MD

Air Traffic Control Radar Beacon System (ATCRBS) Performance Analysis for Los Angeles ARTCC. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 72 45P Gettier,Charles A. ;
CONTRACT: F19628-73-C-0031, DOT-FA70WAI-175
PROJ: FAA-213-503-015
MONITOR: ECAC,FAA-RD PR-72-044,72-36

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), PERFORMANCE(ENGINEERING), CALIFORNIA, DISPLAY SYSTEMS, ELECTROMAGNETIC COMPATIBILITY, RADAR EQUIPMENT, IDENTIFICATION SYSTEMS, TRANSPONDERS (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

On -site observations of air traffic displays are discussed and the analyses of the air traffic electromagnetic environments using performance prediction model techniques are described. Each of the studies evaluates the possibility of hot spots affecting one of the following ATCRBS Air Route Traffic Control Centers: Jacksonville, Washington, New York, Kansas City, and Los Angeles. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 754 265 17/7
IIT RESEARCH INST ANNAPOLIS MD

Air Traffic Control Radar Beacon System (ATCRBS) Performance Analysis for Jacksonville Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 72 52P Gettier,Charles A. ;
CONTRACT: F19628-71-C-0221, DOT-FA70WAI-175
PROJ: FAA-213-503-015
MONITOR: ECAC,FAA-RD PR-72-014,72-33

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), PERFORMANCE(ENGINEERING), FLORIDA, DISPLAY SYSTEMS, ELECTROMAGNETIC COMPATIBILITY, RADAR EQUIPMENT, IDENTIFICATION SYSTEMS, TRANSPONDERS (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

On-site observations of air traffic displays are discussed, and the analyses of the air traffic electromagnetic environments using performance prediction model techniques are described. Each of the studies evaluates the possibility of hot spots affecting one of the following ATCRBS Air Route Traffic Control Centers: Jacsonville, Washington, New York, Kansas City, and Los Angeles. (Author) (U)

AD- 754 264 1/2 17/7 1/5
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - All Weather Landing. (U)

DESCRIPTIVE NOTE: Final rept.
OCT 72 39P
REPT. NO. FAA-ED-07-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALL WEATHER AVIATION, INSTRUMENT LANDINGS), (*AIR TRAFFIC CONTROL SYSTEMS, INSTRUMENT LANDINGS), MANAGEMENT PLANNING AND CONTROL (U)
IDENTIFIERS: INSTRUMENT LANDING SYSTEMS (U)

The plan describes all FAA development activities funded in the all weather landing program including electronic and visual guidance airborne systems, and data collection. It also discusses related projects funded in other programs. The related projects include weather measurement, ground guidance and control, fog dispersal, etc. (Author) (U)

AD- 754 175 17/7
IIT RESEARCH INST ANNAPOLIS MD

Air Traffic Control Radar Beacon System (ATCRBS) Performance Analysis-Washington Air Route Traffic Control Center. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 72 62P Ware,Maximilian , Jr;
CONTRACT: F19628-71-C-0221, DOT-FA70WAI-175
PROJ: FAA-213-503-015
MONITOR: ECAC,FAA-RD PR-72-022,72-34

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, PERFORMANCE(ENGINEERING)), RADAR BEACONS, OPERATION, TRANSPONDERS, RADAR EQUIPMENT, IDENTIFICATION SYSTEMS, ANALYSIS, DISTRICT OF COLUMBIA (U)
IDENTIFIERS: AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS, ATCRBS(AIR TRAFFIC CONTROL RADAR BEACON SYSTEMS) (U)

The objective of the report is to analyze ATCRBS performance and to determine the causes of hot spots in the Washington ARTCC control area, and to suggest suitable corrective measures for their elimination. (Author) (U)

AD- 753 988 17/7
MITRE CORP MCLEAN VA

Engineering and Development Program Plan - Concepts, Design, and Description for the Upgraded Third Generation Air Traffic Control System. (U)

AUG 72 151P
REPT. NO. MTR-6152-Rev-1
CONTRACT: DOT-FA70WA-2448
MONITOR: FAA-ED 01-1A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated January 1972, AD-743 635.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *MANAGEMENT PLANNING AND CONTROL), DESIGN, AUTOMATION, SYSTEMS ENGINEERING, NAVIGATION (U)
IDENTIFIERS: LANDING AIDS, MICROWAVE EQUIPMENT, NAVIGATION, DISCRETE ADDRESS BEACON SYSTEMS (U)

The Air Traffic Control (ATC) system for the next 10 to 20 years is described in two parts: CONUS AIR TRAFFIC CONTROL (includes FSS automation), and OCEANIC AIR TRAFFIC CONTROL (includes AEROSAT applications). The design of both systems is based upon significant improvements in the Third Generation ATC System now being deployed. Key features are: Metering and Spacing Automation, Intermittent Positive Control (IPC), ATC data link services, the Discrete Address Beacon System (DABS), the application of Area Navigation to ATC, the Microwave Landing System (MLS), and the application of satellites to oceanic ATC. The role of automation in both ATC and the delivery of flight services will be greatly expanded to assure system safety, while increasing airport and control system capacities in a productive manner. The above features are integrated into the expected overall system configuration, and its 'fail operational' features are identified. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 753 407 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

The Influence of Surveillance System Parameters on Automated Conflict Detection and Resolution, (U)

NOV 72 57P Andrews,J. W. ;Prado,G. ;
REPT. NO. ATC-15
CONTRACT: F19628-70-C-0230, DOT-FA72WAI-261
PROJ: FAA-RD-034-241-012
MONITOR: FAA-RD 72-100

UNCLASSIFIED REPORT

DESCRIPTORS (*AIR TRAFFIC CONTROL SYSTEMS, *DATA PROCESSING), AIRCRAFT INTERCEPTION, DECISION MAKING, FLIGHT PATHS, TRACKING, COMPUTERS, MISS DISTANCE, ALGORITHMS, MATHEMATICAL MODELS, DATA TRANSMISSION SYSTEMS, AIR TRAFFIC CONTROLLERS (U)
IDENTIFIERS: *COLLISION AVOIDANCE, DABS(DISCRETE ADDRESS BEACON SYSTEM), DISCRETE ADDRESS BEACON SYSTE (U)

The effects of sensor accuracy, data rate, and message delivery delay upon automated conflict detection and resolution processing is analyzed and particular considerations for DABS/IPC operation are discussed. Various options in the design of the algorithmic logic are enumerated and a particular logic is chosen for quantitative inspection. Performance sensitivity calculations for the conflict detection and command generation functions are then presented. The influence of algorithmic logic and traffic environment upon surveillance requirements is delineated. (Author) (U)

AD- 753 013 17/7
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

AGARD Symposium on Air Traffic Control Systems. (U)

NOV 72 13P Victor,A. E. ;Ranger,A. A. ;

REPT. NO. ONRL-C-17-72

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, SYMPOSIA), AIR TRAFFIC, GLIDE PATH SYSTEMS, RADAR LANDING CONTROL, AIRCRAFT LANDINGS, AUTOMATION, AVIATION SAFETY, TERMINAL GUIDANCE (U)
IDENTIFIERS: COLLISION AVOIDANCE (U)

A resume of the AGARD Symposium on Air Traffic Control Systems held at Edinburgh from 26 through 29 June 1972, is given. The conference covered a wide range of topics which were divided into the areas of control concepts and automation; area and enroute navigation; terminal navigation and control systems; landing guidance systems; surveillance; communications and collision avoidance; human aspects in ATC; and integrated communication, navigation and identification systems. A few of the papers given in each session are discussed; a complete listing of titles and authors is given in the appendix. (Author) (U)

AD- 752 258 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF AVIATION ECONOMICS

An Evaluation of the ARTS (Automated Radar Terminal System) III Level of Automation (Third Lot Procurement). (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 72 158P Horowitz,Seymour M. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR EQUIPMENT), AVIATION SAFETY, AIR TRAFFIC, SIMULATION, PERFORMANCE(ENGINEERING), COST EFFECTIVENESS (U)
IDENTIFIERS: BENEFIT COST ANALYSIS (U)

An evaluation of a new Automated Radar Terminal System (ARTS III) for controlling air traffic was made by simulating the air traffic environment in a statistically balanced experimental setting. Similar groups of air traffic controllers using both the ARTS III and the older system were presented with identical traffic patterns. A large number of measures of system performance were taken. Differences favoring the ARTS system were found in the most critical of these measures, safety, and were translated into dollar benefits resulting from an expected reduction in mid-air collisions. A comparison of these dollar benefits with the incremental costs to install and operate the new equipment favored its installation. (Author) (U)

AD- 751 998 17/7
NATIONAL BUREAU OF STANDARDS WASHINGTON D C

Simulation of Air Traffic Control Radar Beacon Code Assignment Plan 3d1. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 72 62P Elbourn,R. D. ;Saunders,P. B. ;
CONTRACT: DOT-FA72WAI-257
PROJ: NBS-6504453
MONITOR: FAA-RD 72-103

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), (*RADAR BEACONS, CODING), SIMULATION, DIGITAL SYSTEMS (U)
IDENTIFIERS: DIGITAL SIMULATION (U)

During implementation of the National Airspace System En Route Stage A, some Air Route Traffic Control Centers will have complete radar data processing capability while other centers have only flight plan data processing capability. The report describes a digital computer simulation of three versions of a radar beacon code assignment plan designed for this situation. The simulation employs one peak day's IFR traffic in the U.S.A. It determines the number of codes required, the numbers of code changes in flight for various reasons, and the variation of the number of code conflicts with the number of codes used. (Author) (U)

AD- 751 933 1/5 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Evaluation of High-Activity Level Tower Cab. (U)

DESCRIPTIVE NOTE: Final rept. Sep 71-Jul 72,
OCT 72 57P Bradley,J. Roy , Jr;
REPT. NO. FAA-NA-72-63
PROJ: FAA-144-170-07X
MONITOR: FAA-RD 72-111

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRPORT CONTROL TOWERS, *HUMAN FACTORS ENGINEERING), (*AIR TRAFFIC CONTROL SYSTEMS, HUMAN FACTORS ENGINEERING), LIGHTING EQUIPMENT, DESIGN, ACCEPTABILITY, MAN MACHINE SYSTEMS, DISPLAY SYSTEMS (U)
IDENTIFIERS: *CONSOLES (U)

The project was conducted to develop operator's consoles, lighting systems, and other features that would provide a modern, efficient, and pleasant operating environment for the octagonal tower cab, which is proposed for use at high-activity level airports. A full-scale mockup of the tower cab was constructed at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey. The mockup was equipped with experimental consoles, lighting systems, and appropriate environmental innovations. A 3-week evaluation was conducted with participation by air traffic control specialists from nine of the 11 Federal Aviation Administration's Regions. (Author) (U)

AD- 751 923 17/9 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Theory for Optimal Moving Target Indicator (MTI) Digital Signal Processing. Supplement I. (U)

DESCRIPTIVE NOTE: Technical note,
OCT 72 20P McAulay,Robert J. ;
REPT. NO. TN-1972-14-Suppl-1
CONTRACT: F19628-73-C-0002
PROJ: AF-649L
MONITOR: ESD TR-72-243

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supplement to AD-738 298 and AD-750 747.
DESCRIPTORS: (*MOVING TARGET INDICATORS, *AIR TRAFFIC CONTROL SYSTEMS), (*RADAR TARGETS, TARGET RECOGNITION), RADAR CLUTTER, SIGNAL-TO-NOISE RATIO, INFORMATION THEORY, FOURIER ANALYSIS, INTEGRAL TRANSFORMS (U)
IDENTIFIERS: SIGNAL PROCESSING, FOURIER TRANSFORMATION (U)

In the report, 'A Theory for Optimal MTI Digital Signal Processing. Part I. Receiver Synthesis,' (1), the problem of eliminating scanning ground clutter from an aircraft surveillance radar was examined from a statistical decision theoretical point of view. An optimum processor was derived which could be approximated by a clutter filter followed by a discrete Fourier transform (DFT). In the report, additional numerical work is documented that compares the performance of the pulse cancellers with feedback and the DFT with that of the optimum processor. The issue of coherent vs incoherent integration gain is considered by comparing the filters only on their ability to reject clutter. A clutter rejection improvement factor is defined and used to compare the various filters. It is shown that the pulse cancellers can be quite effective in rejecting clutter provided the input clutter power is not too large and that additional gains are possible using the DFT. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 751 556 5/9 17/7
BUNKER-RAMO CORP WESTLAKE VILLAGE CALIF ELECTRONIC SYSTEMS DIV

Training Effectiveness Evaluation of Naval Training Devices. Part I A Study of the Effectiveness of a Carrier Air Traffic Control Center Training Device. (U)

DESCRIPTIVE NOTE: Final rept. Jun 70-Apr 71,
AUG 72 115P Finley,Dorothy L. ;
Rheinlander ,Thomas W. ;Thompson,Ernest A. ;
Sullivan,Dennis J. ;
CONTRACT: N61339-70-C-0258
PROJ: NAVTRADEVCEN-8264-2
MONITOR: NAVTRAEQUIPC 70-C-0258-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRAINING DEVICES, *AIR TRAFFIC CONTROL SYSTEMS), (*CARRIER LANDINGS, TRAINING DEVICES), EFFECTIVENESS (U)
IDENTIFIERS: EVALUATION (U)

The study evaluated the effectiveness of the Carrier Air Traffic Control Center (CATCC) training device in training teams to safely and efficiently control aircraft recoveries and to effectively maintain communications necessary to implement this control function. The results indicate the device is quite effective in that team, subteam, and individual performances generally improve during training; that student capability to deal with recovery contingencies and emergencies improves; that students generally perform acceptably in the operational job setting and that empirical evidence supports (but does not prove due to the study design) the transfer of training hypothesis; and that students gave the device moderate to high ratings on realism and effectiveness characteristics. It was concluded that device effectiveness could be further improved and that recommendations were worth consideration due to the considerable impact CATCC has on the efficiency and safety of carrier recovery operations. (Author) (U)

AD- 751 485 17/7
MITRE CORP BEDFORD MASS

Understanding Kalman Filtering and its Application in Real Time Tracking Systems. (U)

DESCRIPTIVE NOTE: Technical rept., JUL 72 68P Burke,J. J. ;
REPT. NO. MTR-2417
CONTRACT: F19628-71-C-0002
PROJ: AF-4510
MONITOR: ESD TR-72-312

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MATHEMATICAL MODELS), RADAR TRACKING, REAL TIME, EQUATIONS OF MOTION, ANALYSIS OF VARIANCE, CONFIDENCE LIMITS, MATRICES(MATHEMATICS), ALGORITHMS (U)
IDENTIFIERS: *KALMAN FILTERS, CONTROL THEORY, ESTIMATION THEORY (U)

The theory and applications of Kalman filtering have now been under development for over a decade. Kalman filtering is currently being used operationally in numerous applications such as satellite tracking systems, aircraft navigational systems and aircraft tracking systems. Because Kalman filtering is a statistical concept that is typically described in terms of state-space notation, project managers and engineers must frequently accept on abstruse set of equations while feeling insufficiently qualified to appreciate their significance or applicability. In spite of the obscure terminology and associated matrix notation that typically accompanies any discussion of Kalman filtering, the salient features of the theory are relatively straightforward and can be presented in a manner that appeals to intuition. The paper represents such an attempt with emphasis on applications to real time tracking systems. (Author) (U)

AD- 751 312 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

A Comparative Study of Female and Male Air Traffic Controller Trainees, (U)

MAY 72 27P Cobb,Bart B. ;Mathews,John J. ;Lay,Carolyn D. ;
MONITOR: FAA-AM 72-22

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Errata sheet inserted.
DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, *FEMALES), (*MALES, AIR TRAFFIC CONTROLLERS), PERFORMANCE(HUMAN), EDUCATION, ATTRITION, SELECTION, TRAINING, STATISTICAL ANALYSIS (U)

The study compares age, education, pre-FAA experience, aptitudes, training-course performance measures, and post-Academy attrition rates of the 83 women who entered basic air traffic control (ATC) training at the FAA Academy during November 1968 through March 1970 with those of various samples of the 3,760 males who entered training during the same period. The study revealed no significant differences between the means of the female and male trainees with respect to age and educational level. When samples of the 83 females were compared with groups of male trainees in terms of performance on 36 different aptitude tests, only four mean differences, all of which favored the females, proved statistically significant. (Author) (U)

AD- 750 939 17/7
STANFORD RESEARCH INST MENLO PARK CALIF

The Air Traffic Controller's Contribution to ATC(Air Traffic Control) System Capacity in Manual and Automated Environments. Volume I: Summary Report. (U)

DESCRIPTIVE NOTE: Interim rept. no. 2 Jun 71-Jun 72, JUN 72 52P Ratner,R. S. ;Williams,J. O. ;Glaser,M. B. ;Stuntz,S. E. ;
CONTRACT: DOT-FA70WA-2142
PROJ: SRI-8181
MONITOR: FAA-RD 72-63-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-750 940.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *REVIEWS), (*AIR TRAFFIC CONTROLLERS, DECISION MAKING), PERFORMANCE(HUMAN), AUTOMATION, ENVIRONMENT (U)

Volume I contains sufficient background material to put the work in perspective, summarizes the methodology used, and presents the study findings and implications for effective automation, as well as quantative capacity estimates and predictions. The methodology is based on a technique called the Relative Capacity Estimating Process (RECEP), developed to assess the implications of controller judgmental factors and decision processes for attainable capacity at several levels of automation. RECEP incorporates a technique of sector operational measurement that includes video recording and structured controller interviews. The technique has been applied to various types of transition, terminal interface, and en route sector operations in several FAA facilities. Results obtained include capacity estimates, for each of the airspace sectors studied, as operated at present and at several future levels of automation. (Author) (U)

AD- 750 747 17/9 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Theory for Optimal MTI (Moving Target Indicator) Digital Signal Processing: Part II. Signal Design. (U)

DESCRIPTIVE NOTE: Technical note, OCT 72 59P McAulay,Robert J. ;
REPT. NO. TN-1972-14-Pt-2
CONTRACT: F19628-73-C-0002
MONITOR: ESD TR-72-217

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 1, AD-738 298.
DESCRIPTORS: (*MOVING TARGET INDICATORS, *AIR TRAFFIC CONTROL SYSTEMS), (*RADAR TARGETS, TARGET RECOGNITION), DOPPLER EFFECT, RADAR CLUTTER, DECISION THEORY, STATISTICAL ANALYSIS, INFORMATION THEORY, GAIN, WHITE NOISE, PROBABILITY DENSITY FUNCTIONS, RADAR SIGNALS, INTEGRAL TRANSFORMS, FOURIER ANALYSIS (U)
IDENTIFIERS: AMBIGUITY FUNCTIONS, SIGNAL PROCESSING, FOURIER TRANSFORMATION (U)

In part 1 of the report the optimum MTI receiver was derived and analyzed for the case in which the radar pulses were emitted from the transmitter equally spaced in time. For typical long range ATC surveillance radars, aliasing of the target and clutter spectra results in detection blind speeds at multiples of approximately 70 knots. It is well known operationally that these blind speeds can be eliminated by staggering the transmitter PRF. Heretofore, there has been no thorough theoretical analysis of the effect of staggered PRF on the spectral distribution of the target and clutter signals. It is shown in part 2 that the clutter spectral density continues to fold over at the PRF, but that the signal spectrum becomes dispersed in frequency, somewhat like an anti-jam signal. It is further noted that even when the target Doppler shifts are more than one PRF apart, the spectra are distinguishable, suggesting that unambiguous Doppler estimation may be possible. (Author) (U)

AD- 750 630 17/2.1
WILCOX ELECTRIC CO INC KANSAS CITY MO

Development of VHF 8-Watt Transmitter Type TV-35. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 72 74P Lee,J. E. ;
CONTRACT: FA64WA-5250
MONITOR: FAA-RD FAA-RD

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIO TRANSMITTERS, *AIR TRAFFIC CONTROL SYSTEMS), VERY HIGH FREQUENCY, AIRPORT CONTROL TOWERS, AMPLITUDE MODULATION, SURFACE TO AIR (U)

The report describes the design, development, and testing of a VHF ground-to-air radio transmitter for the Federal Aviation Administration. The transmitter is intended for remote operation at airport traffic control towers. It produces a vhf carrier that is amplitude-modulated by an external audio signal. The transmitter contains a crystal oscillator with one crystal pretuned to 121.9 MHz, frequency multipliers, a power amplifier, and a self-contained power supply and low-level modulator. Secondary circuits include a multimeter for tuneup and monitoring, and automatic protective circuits for the power amplifier stage. (Author) (U)

AD- 750 178 5/10 5/8
ILLINOIS UNIV SAVOY AVIATION RESEARCH LAB

Pilotage Error in Area Navigation: Effects of Symbolic Display Variables. (U)

DESCRIPTIVE NOTE: Final rept. 28 May-27 Dec 71 on Phase 1,
JAN 72 151P Jensen,Richard S. ;
VanderKolk,Richard J. ;Roscoe,Stanley N. ;
REPT. NO. ARL-72-3/FAA-72-1
CONTRACT: DOT-FA71WA-2574
MONITOR: FAA-RD 72-29

UNCLASSIFIED REPORT

DESCRIPTORS: (*PILOTS, PERFORMANCE(HUMAN)), (*NAVIGATION, *AIR TRAFFIC CONTROL TERMINAL AREAS), (*DISPLAY SYSTEMS, HUMAN FACTORS ENGINEERING), STEERING, ERRORS, FLIGHT INSTRUMENTS, FLIGHT TESTING (U)
IDENTIFIERS: NAVIGATION (U)

Pilotage errors in area navigation terminal operations were measured in flight and in a flight simulation laboratory. Experimental display variables included scale factor of course deviation indications, whether course deviation is presented in linear or angular fashion, and whether or not either actual or relative heading is presented integrally with course deviation. The major task variable was the angle between successive route segments. (Author) (U)

AD- 749 505 17/2.1 17/7
LITCHFORD SYSTEMS NORTHPORT N Y

Study and Analysis of SC-117, National and USAF Plans for a New Landing System. (U)

DESCRIPTIVE NOTE: Final rept. May 71-Apr 72,
JUL 72 242P Litchford,George B. ;
REPT. NO. L-AF-05
CONTRACT: F33615-71-C-1601
MONITOR: AFFDL TR-72-76-Pt-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*GLIDE PATH SYSTEMS, MULTIPATH TRANSMISSION), (*AIR TRAFFIC CONTROL SYSTEMS, *MICROWAVE EQUIPMENT), REVIEWS, ANTENNA RADIATION PATTERNS, AIRCRAFT ANTENNAS, FLIGHT PATHS, PHASE LOCKED SYSTEMS, COST EFFECTIVENESS (U)
IDENTIFIERS: LANDING AIDS, MICROWAVE EQUIPMENT (U)

With SC-117, national, and USAF plans partially formulated for the design of a new Microwave Landing System (MLS) to meet common civil/military and common CTOL/VSTOL requirements, attention is now focused on technical and operational areas of landing where critical decisions must be made to narrow the competing techniques to a single national standard. The Air Force missions utilize not only conventional, fixed MLS installations, but also mobile MLS units quickly installed at remote or foreign airfields. A design of a very-low-cost MLS is outlined since the number of military aircraft to be equipped with MLS will be determined by the minimum cost (and minimum service configurations) of the national MLS system. (Author) (U)

AD- 749 326 17/7 1/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

A Method for Solution of an Air Traffic Control Problem. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 72 20P Franke,Richard H. ;
REPT. NO. NPS-53FE72071A

UNCLASSIFIED REPORT

DESCRIPTORS: (*CARRIER LANDINGS, *AIR TRAFFIC CONTROL SYSTEMS), AUTOMATIC PILOTS, FLIGHT PATHS, OPTIMIZATION, QUEUEING THEORY, TIME STUDIES, FORMATION FLIGHT, TURNING FLIGHT, INTERACTIONS (U)
IDENTIFIERS: *FLIGHT PLANS (U)

A method is given for computing flight plans for aircraft returning to the carrier after a mission. The basic goal is to minimize the total flight time for the landing aircraft, while maintaining various individual and interactive constraints on the aircraft. (Author) (U)

AD- 749 307 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Engineering and Development Program Plan - Oceanic Air Traffic Control Automation. (U)

JUL 72 157P
REPT. NO. FAA-ED-10-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SCHEDULING, FLIGHT PATHS, DATA PROCESSING, DATA TRANSMISSION SYSTEMS, DATA STORAGE SYSTEMS, DISPLAY SYSTEMS, INPUT OUTPUT DEVICES, COSTS, RELIABILITY, MANAGEMENT PLANNING AND CONTROL (U)

The Technical Development Plan (TDP) is one in a series of program plans published to document the Engineering and Development activities of the Federal Aviation Administration (FAA). It provides a functional description, a technical approach and a management and fiscal plan for the development of an Automated Oceanic Air Traffic Control (ATC) System. This system is necessary to provide improvements and efficiencies in the current manual method of ATC in the oceanic environment. (Author) (U)

AD- 749 280 1/5 5/10
MASSACHUSETTS INST OF TECH CAMBRIDGE

Simulator Evaluation of Pilot Assurance Derived from an Airborne Traffic Situation Display. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 71-28 Feb 72 on Phase I,
FEB 72 169P Howell,Jack D. ;
CONTRACT: F19628-70-C-0230, DOT-FA71WAI-234
MONITOR: FAA-EM 72-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*DISPLAY SYSTEMS, *HUMAN FACTORS ENGINEERING), (*AIR TRAFFIC CONTROL SYSTEMS, DISPLAY SYSTEMS), (*COMMERCIAL PLANES, *LANDING AIDS), ATTITUDES(PSYCHOLOGY), CATHODE RAY TUBE SCREENS, DATA TRANSMISSION SYSTEMS, PILOTS, PERFORMANCE(HUMAN), PERFORMANCE(HUMAN), PLAN POSITION INDICATORS (U)
IDENTIFIERS: *COLLISION AVOIDANCE, EVALUATION (U)

An extensive series of tests were run on a transport cockpit simulation facility to evaluate the pilot assurance value of airborne displays used as traffic situation monitors in high-density terminal airspace. The twenty professional pilots employed as subjects were exposed to a set of typical normal and abnormal terminal approach situations. Their level of assurance was determined from their detailed knowledge of each situation, measured by stop-action quizzes, and the ability to detect conflicts. Workload or the degree of difficulty the pilots experienced in acquiring relevant information about the situation was also regarded as a component of assurance. Specific problem areas emphasized in the test scenarios were simultaneous approaches to closely-spaced parallel runways, blunder detection and resolution, and providing a 'picture' for the pilot when discrete address data links replace current ATC party-line communications. (Author) (U)

AD- 748 901 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF MANAGEMENT SYSTEMS

Air Traffic Patterns for IFR and VFR Aviation, Calendar Year 1971. (U)

JUN 72 154P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Nov 71, AD-735 970.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, STATISTICAL DATA), CIVIL AVIATION, MILITARY TRANSPORTATION, TRANSPORT AIRCRAFT, FLIGHT PATHS, PERIODIC VARIATIONS, TERMINAL FLIGHT FACILITIES (U)
IDENTIFIERS: *FLIGHT PLANS, IFR(INSTRUMENT FLIGHT RULES), INSTRUMENT FLIGHT RULES, VFR(VISUAL FLIGHT RULES), VISUAL FLIGHT RULES (U)

The report presents a detailed record of flight plans filed at flight service stations and combined station/towers as collected in a 2-percent random sample of all Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) flight plans filed in the 50 states and the ARTC area of San Juan, Puerto Rico. These data furnished the various Offices and Services of the Federal Aviation Administration with terminal and enroute air traffic activity for use in planning and management of the air traffic control system. (Author) (U)

AD- 748 302 17/7
HONEYWELL INC MINNEAPOLIS MINN SYSTEMS AND RESEARCH DIV

Advanced Carrier-Based Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final technical rept. 15 Mar 71-14 Jul 72 on Phase 2,
AUG 72 112P Curtner,Keith L. ;Kirk, Raymond J. ;Irons,Robert P. ;Zagalsky,Nelson R. ;
REPT. NO. F2027-FR
CONTRACT: N00014-71-C-0265
PROJ: NR-215-188

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Mar 72, AD-739 713.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OPTIMIZATION), MATHEMATICAL MODELS, NAVAL AIRCRAFT, FLIGHT PATHS, JET FIGHTERS, SIMULATION, COMPUTER PROGRAMMING (U)
IDENTIFIERS: F-4 AIRCRAFT, DIGITAL SIMULATION (U)

A carrier-based air traffic control system which features enroute trajectory optimization and a computer-aided marshal reassignment procedure is described. Results of computer simulations of both the airborne and shipboard systems are used to demonstrate system concept feasibility. The system description is followed by system performance estimates and hardware requirements estimates. (Author) (U)

AD- 747 990 6/14
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

The Use of Simple Indicators for Detecting Potential Coronary Heart Disease Susceptibility in the Air Traffic Controller Population, (U)

MAY 72 11P Lategola,Michael T. ;
MONITOR: FAA-AM 72-20

UNCLASSIFIED REPORT

DESCRIPTORS: (*CARDIOVASCULAR DISEASES, PREDICTIONS), (*AIR TRAFFIC CONTROLLERS, CARDIOVASCULAR DISEASES), MEDICAL EXAMINATION, BLOOD PRESSURE, HEART, PHYSIOLOGY, PATHOLOGY, OBESITY, AGING(PHYSIOLOGY), DIAGNOSIS(MEDICINE) (U)
IDENTIFIERS: SIGNS AND SYMPTOMS (U)

An analysis was made of an eight-year interval change in several indicators of coronary heart disease (CHD) susceptibility as measured on 475 male air traffic control (ATC) personnel. The initial measurements were obtained from these personnel as ATC students in 1960-1963 and the subsequent data were obtained eight years later from their current aeromedical certification records. This analysis revealed a general trend of advancing relative susceptibility to CHD with age and obesity. Sample sizes (in age by obesity cells) were frequently too small to warrant any statement of significance for this general trend. As a logical followup, an analysis of similar data from 23,826 male ATC personnel was accomplished. The data were obtained from current aeromedical certification records in January 1971. The distributions of resting blood pressure (BP), resting heart rate (HR) and the 400 pathology code frequency were compiled in age versus Framingham relative weight index (FRWI) tables. Obesity was defined as a minimum FRWI of 120.0%. Substantiating earlier findings, all parameters generally increased with age and obesity. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 747 656 17/7
INSTRUMENT FLIGHT CENTER RANDOLPH AFB TEX

Dulles Category IIIA ILS Evaluation. (U)

DESCRIPTIVE NOTE: Technical rept.,
MAY 72 19P Carmack,Donald L. ;
REPT. NO. IFC-TR-72-2
PROJ: CDG-PF-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, INSTRUMENT LANDINGS), LANDING AIDS, GLIDE PATH SYSTEMS, FLIGHT TESTING (U)
IDENTIFIERS: LOCALIZERS, *INSTRUMENT LANDING SYSTEMS, EVALUATION (U)

The Category IIIA ILS guidance system is designed to provide a VHF/UHF localizer and glide slope with increased performance and a backup capability. The overall flyability of the systems must be superior to a Category I or II system due to the lower minimums (700 feet RVR) authorized for the approach. Since the radiated signal is in the UHF/VHF frequency band, it is subject to the same errors and limitations caused by ground or airborne vehicles. The success, then, of a Category IIIA approach depends on the control of interference factors and capability of the aircraft and pilot to maintain the localizer and glide path. (Author) (U)

AD- 747 566 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Comparison of Immunity to Garbling for Three Candidate Modulating Schemes for DABS (Discrete Address Beacon System). (U)

DESCRIPTIVE NOTE: Project rept., AUG 72 38P Shnidman,D. A. ;
REPT. NO. ATC-12
CONTRACT: DOT-FA72WAI-261, F19628-70-C-0230
PROJ: FAA-034-241-012
MONITOR: FAA-RD 72-84

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR BEACONS, MODULATION), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), ELECTROMAGNETIC COMPATIBILITY, PULSE AMPLITUDE MODULATION, RADIOFREQUENCY INTERFERENCE (U)
IDENTIFIERS: FREQUENCY SHIFT KEYING, DABS(DISCRETE ADDRESS BEACON SYSTEM), DIFFERENTIAL PHASE SHIFT KEYING, DISCRETE ADDRESS BEACON SYSTEMS (U)

The performance of three candidate modulation schemes for DABS is analyzed and a comparison on the basis of probability of error per bit is made. The three types of modulation are PAM, DPSK, and FSK. The results show that, at a given level of interference and signal-to-noise ratio, DPSK and FSK have a lower P sub e/bit than PAM and this difference is significant in most cases. In addition to P sub e/bit, however, the choice of modulation and message format depends on the capacity required, bandwidth occupancy, and cost of implementation. This list consideration is especially important with regard to the transponder. (Author) (U)

AD- 747 133 17/7 18/3
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

Electromagnetic Pulse (EMP) Protection Study. (U)

DESCRIPTIVE NOTE: Final rept. 15 Jan-31 May 72, JUN 72 153P Peele,Warren D. ;Eveleigh, Virgil ;Revay,Andrew , Jr;
CONTRACT: DOT-FA72WAI-241
MONITOR: FAA-RD,GIDEP 72-68,E083-2297

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, ELECTROMAGNETIC SHIELDING), (*ELECTRONIC EQUIPMENT, DAMAGE), AIRBURST, RADAR EQUIPMENT, ELECTROMAGNETIC COMPATIBILITY, ELECTROMAGNETIC PULSES, SEMICONDUCTOR DEVICES, FEASIBILITY STUDIES, NUCLEAR EXPLOSIONS, (U)NUCLEAR EXPLOSIONS (U)

The purpose of the study was to assess the potential effects of electromagnetic pulse (EMP) radiation on the Federal Aviation Administration electronic and electric systems with a focus on the determination of the feasibility of protecting these systems from EMP effects. The report consists of five brief chapters on the characteristics of the high energy EMP phenomenon of a nuclear blast and subsequent equipment susceptibility via radiated and conducted interference. Six appendices document in detail the aspects of grounding, cable coupling, metallic penetrations, shielding, system susceptibility, circuit susceptibility, and the phenomenology of semiconductor damage. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 747 069 1/5 5/5
IIT RESEARCH INST CHICAGO ILL

Study of Reduction of Glare, Reflection, Heat and Noise Transfer in Air Traffic Control Tower Cab Glass. (U)

DESCRIPTIVE NOTE: Final rept. 16 Apr-31 Oct 71,
MAR 72 104P Clinch,J. Michael ;
CONTRACT: DOT-FA71WA-2564
PROJ: IITRI-J6247
MONITOR: FAA-RD 72-65

UNCLASSIFIED REPORT

DESCRIPTORS: (*LAMINATED GLASS, REFLECTION), (*AIR TRAFFIC CONTROL TERMINAL AREAS, HUMAN FACTORS ENGINEERING), AIR TRAFFIC CONTROL SYSTEMS, AIR TRAFFIC CONTROLLERS, VISUAL PERCEPTION, AIRCRAFT NOISE, ATTENUATION, THERMAL PROPERTIES (U)
IDENTIFIERS: GLARE (U)

The results of a study to formulate methods to reduce the glare, reflections and heat and noise transmission of the glass area of ATCT cabs are described. As a result of field surveys of various ATCT cabs, consultation with glass manufacturers, and technical report searches, several recommendations (to reduce the foregoing disturbances) were submitted. Practical factors considered include the shape of the cab, tilt angle of cab glass, type of glass, heating and air conditioning requirements, window fogging, and environmental noise. A cost versus benefit model has been made for evaluating the effect of glare and reflections on controller tasks in a simulated ATCT cab environment. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 746 863 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Collision Avoidance, An Annotated Bibliography, September 1968-April 1972. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 72 268P Bulford,Dorothy E. ;
REPT. NO. FAA-NA-72-41

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-677 942.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AVIATION SAFETY), (*AVIATION SAFETY, *BIBLIOGRAPHIES), FLIGHT PATHS, AIR TRAFFIC, AVIATION ACCIDENTS, WARNING SYSTEMS, PROXIMITY DEVICES (U)
IDENTIFIERS: CAS(COLLISION AVOIDANCE SYSTEMS), COLLISION AVOIDANCE SYSTEMS, *COLLISION AVOIDANCE (U)

In November 1968 a bibliography consisting of 1013 references without annotations was issued as FAA report number NA-68-54 (AD-677 942). The present work supplements that report. In addition to the Subject and Corporate Author Indexes of the 1968 listing, this bibliography includes a Personal Names Index which will help find secondary authors or locate names mentioned in titles and abstracts. (Author) (U)

AD- 746 056 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

A Proposed New Test for Aptitude Screening of Air Traffic Controller Applicants. (U)

MAY 72 30P Cobb,Bart B. ;Mathews,John J. ;
MONITOR: FAA-AM 72-18

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, *APTITUDE TESTS), SELECTION, TEST CONSTRUCTION(PSYCHOLOGY), RELIABILITY (U)
IDENTIFIERS: PERSONNEL SCREENING TESTS (U)

The study concerns the development and experimental validation of a novel aptitude test, referred to as 'Directional Headings' (or DHT), for the selection of Air Traffic Control Specialist (ATCS) trainees. The test requires the subject to rapidly interpret letters, symbols, and degrees in order to determine: directional headings (Part I), the exact opposites of headings (Part II), and opposites of headings under conditions of aural distraction (Part III). Reliability of the instrument, as determined by corelating the scores based on even-numbered items versus scores based on odd-numbered items, was .93. (Author) (U)

AD- 745 119 17/7 1/2
ARMY AEROMEDICAL RESEARCH LAB FORT RUCKER ALA

Differential Velocity and Time Prediction of Motion, (U)

APR 72 34P Kimball,Kent A. ;Hofman, Mark A. ;Nossaman,Richard O. ;
REPT. NO. USAARL-72-14
PROJ: DA-3-A-062110-A-819

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTERCEPT TRAJECTORIES, *AVIATION SAFETY), (*AIR TRAFFIC CONTROL SYSTEMS, DECISION MAKING), PREDICTIONS, DISPLAY SYSTEMS, AIR TRAFFIC CONTROLLERS, PERFORMANCE(HUMAN), PERFORMANCE(HUMAN), REACTION KINETICS, ANALYSIS OF VARIANCE, ERRORS (U)
IDENTIFIERS: *COLLISION AVOIDANCE (U)

The investigation examined the effects of differential target velocity, horizontal or vertical plane conditions and air traffic controller experience on the intersection time estimation accuracy of two converging targets. Performance accuracy on this task was not significantly affected by horizontal or vertical conditions nor by air traffic controller experience. However, accuracy in magnitude and direction was found to significantly vary as a function of cursor speed with slower speeds producing the poorer performance. A differential effect for various speed combinations was also noted. Estimation accuracy on the slowest cursor speed when paired with the two faster speeds was decreased while accuracy on the intermediate speed was degraded when combined with either slower or faster speeds. Estimations on the fastest speed were not affected by differential pairings. (Author) (U)

AD- 744 876 1/2 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

A Survey to Determine Flight Plan Data and Flight Schedule Accuracy. (U)

DESCRIPTIVE NOTE: Technical rept., JAN 72 119P Coonan,John R. ;
REPT. NO. TSC-FAA-72-10
CONTRACT: FA-206

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC, SCHEDULING), (*COMMERCIAL PLANES, *AIR TRAFFIC CONTROL SYSTEMS), TAKEOFF, AIRCRAFT LANDINGS, FLIGHT PATHS, AIR TRAFFIC CONTROL TERMINAL AREAS, AIR TRAFFIC CONTROLLERS, COUNTING METHODS, ACCURACY (U)
IDENTIFIERS: COMPUTER AIDED ANALYSIS (U)

The report describes a survey made to determine operational flight plan data and flight scheduling accuracy vs. published schedules and/or stored flight plan data. This accuracy was determined by sampling tracer flights of varying lengths, selected terminals, and high altitude sectors; then comparing this data with stored computer data, thus, revealing average delay areas. This information will aid operational analysts and programmers to construct flow control software programs. (Author) (U)

AD- 744 862 17/7
TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MASS

Evaluation of the FAA Advanced Flow Control Procedures. (U)

DESCRIPTIVE NOTE: Technical rept. 1971-1972, JAN 72 214P Bellantoni,J. F. ;Coonan, J. R. ;Medeiros,M. F. ;
REPT. NO. TSC-FAA-72-8

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, EFFECTIVENESS), RELIABILITY, SIMULATION, STATISTICAL ANALYSIS, SYSTEMS ENGINEERING (U)
IDENTIFIERS: EVALUATION (U)

The report is an evaluation of the present FAA Advanced Flow Control Procedures (AFCP), based on data gathered from its implementation on February 5, 1971 and on a fast-time digital simulation of traffic feeding into the NY airports on that day. The report discusses the effectiveness of AFCP in theory in the February 5 case study, and as modelled in the simulation. Recommendations are made (1) to retain the concept, (2) to modify the procedures, (3) to modify the computer program, and (4) to conduct further research. (Author) (U)

AD- 743 635 17/7
MITRE CORP MCLEAN VA

Concepts, Design and Description for the Upgraded Third Generation Air Traffic Control System, as of January 1972. CONUS ATC System. Oceanic ATC System. (U)

JAN 72 145P
MONITOR: FAA-ED 01-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DESIGN), AIRPORTS, AIR TRAFFIC CONTROL TERMINAL AREAS, UNITED STATES, AIR TRAFFIC, AUTOMATION, PREDICTIONS (U)

The document presents the concepts and an overall system design which is capable of satisfying specific goals and objectives presently established for the system of the late 1970s and the 1980s. It describes the proposed new features, equipment, and automation now being programmed for development and evaluation. The emphasis is on the bases for the proposed design and the operational implications of the design for both the aircraft operators and pilots and for the air traffic controllers and flight services specialists. (Author) (U)

AD- 743 569 12/1 17/7
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE VA

Solution of One Problem in Nonlinear Programming (Reshenie Odnoi Zadachi Nelineinogo Programmirovaniya), (U)

72 7P Kalchenko,G. T. ;
Shidlovskii,A. Ya. ;
REPT. NO. FSTC-HT-23-848-71
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Akademiya Nauk Latviiskoi SSR, Riga. Izvestiya. Seriya Fizicheskikh i Tekhnicheskikh Nauk. n3 p93-96 1966, by Albert L. Peabody.
DESCRIPTORS: (*NONLINEAR PROGRAMMING, OPTIMIZATION), (*AIR TRAFFIC CONTROL SYSTEMS, MATHEMATICAL MODELS), APPROXIMATION(MATHEMATICS), INEQUALITIES, USSR (U)
IDENTIFIERS: TRANSLATIONS, *CONTROL THEORY (U)

The article presents an approximate method for solution of the problem of maximization of a nonlinear separable function with bilateral limitations on the unknowns and fixed general lower boundary of the modulus of the unknowns difference. The possibility is demonstrated of applying this method to some problems of air traffic control. (Author) (U)

AD- 743 424 5/10
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

The Color-Word Interference Test and Its Relation to Performance Impairment Under Auditory Distraction. (U)

MAR 72 8P Thackray,Richard I. ;Jones, Karen N. ;Touchstone,Robert M. ;
PROJ: FAA-AM-A-71-PSY-22, FAA-AM-A-72-PSY-22
MONITOR: FAA-AM 72-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, *ATTENTION), (*AUDITORY SIGNALS, INTERFERENCE), PERFORMANCE(HUMAN), VISUAL PERCEPTION (U)
IDENTIFIERS: STROOP COLOR WORD TEST (U)

The ability to resist distraction is an important requirement for air traffic controllers. The study examined the relationship between performance on the Stroop color-word interference test (a suggested measure of distraction susceptibility) and impairment under auditory distraction on a task requiring the subject to generate random sequences of letters. Fifty male college students served as Ss. Although there was a significant decrease in 'randomness' as a result of auditory distraction, the correlation between change in randomness and amount of color-word interference wa nonsignificant. These findings, along with those of several other studies, suggest that the Stroop test may measure a rather restricted type of perceptual interference essentially unrelated to a possibly more general ability tc maintain concentration in the presence of competing (distracting) stimuli. (Author) (U)

AD- 742 964 17/7 4/2
NAVAL AMMUNITION DEPOT CRANE IND

Slant Visual Range/Approach Light Contact Height Measurement System. Mathematical Simulation to Aid in Selecting SVR/ALCH Measurement Equipment. (U)

DESCRIPTIVE NOTE: Final rept. 10 Apr 71-10 Feb 72 on Phase 1,
APR 72 161P Lohkamp,G. ;Bradley,G. ; Chipman,R. ;Montgomery,D. ;Bagrash,F. ;
CONTRACT: DOT-FA1WAI-213
PROJ: FAA-151-262-022
MONITOR: FAA-RD 72-42

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, VISIBILITY), (*VISIBILITY, METEOROLOGICAL INSTRUMENTS), MATHEMATICAL MODELS, NUMERICAL ANALYSIS, ATMOSPHERE MODELS, PREDICTIONS, OPTICAL RADAR, CLOUD HEIGHT INDICATORS (U)

Mathematical simulation was used to compare candidate systems for Slant Visual Range/ Approach Light Contact Height measuring equipment. Inputs to the simulation include response of the human visual system, typical atmospheric data, atmospheric scattering data, and characteristics of each candidate system. The candidate systems modeled were the transmissometerceilometer, Videograph 8, two backscatter lidar systems, and a forward scatter laser system. Other systems were studied but eliminated for various reasons before simulation. (Author) (U)

AD- 742 474 6/18 6/10
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

A Study of Atmospheric Ionization: Measurements of the Ion Conditions in an ATC Laboratory and a Review of the Literature of Ion Effects on Performance. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 72 70P Rosenberg,Bruce L. ;
REPT. NO. FAA-NA-72-19
PROJ: FAA-198-001-01X, FAA-215-201-01X

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIATION EFFECTS, IONS), (*AIR TRAFFIC CONTROLLERS, RADIATION EFFECTS), HUMIDITY, PERFORMANCE(HUMAN), DOSAGE, RESPIRATORY SYSTEM, RADAR EQUIPMENT, IONIZATION (U)
IDENTIFIERS: ION DENSITY(CONCENTRATION) (U)

Reports of irritating sensations affecting the face, nose, and eyes when working at ATC radar positions motivated the study. The possibility was considered that an atmospheric ion imbalance, due to the high voltages present on the equipment could be the cause of the observed sensations. Accordingly, a project was initiated for the measurement of atmospheric ion levels. A significant Percent Excess Charge for very small ions was found in the vicinity of the RBDE-5 radar displays. The imbalance, in favor of positive ions, exceeded +33 percent. This positive imbalance, possibly the cause of the irritating sensations, might be due to the 20 kilovolt positive accelerating potential used for the displays. The literature on atmospheric ions was reviewed to determine the relationship between ion levels and task performance and health. The thresholds for the onset of deleterious effects of positive ions were tentatively defined. (Author) (U)

AD- 741 736 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

Multiple Task Performance as a Predictor of the Potential of Air Traffic Controller Trainees, (U)

JAN 72 31P Chiles,W. Dean ;Jennings, Alan E. ;West,Georgetta ;Abernathy,William T. ;
PROJ: FAA-AM-A-71-PSY-29
MONITOR: FAA-AM 72-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, PERFORMANCE(HUMAN)), TRAINING, SELECTION (U)
IDENTIFIERS: PERSONNEL SCREENING TESTS (U)

Two hundred and twenty-nine air traffic controller trainees were tested on the CAMI Multiple Task Performance Battery. The battery provides objective measures of monitoring, arithmetical skills, visual discrimination, and group problem solving. The criterion of trainee potential was based on ratings from FAA Academy instructors in courses being attended by the trainees. Five studies were conducted. For each study, the quality coefficient is based on one hour of testing with about 50 minutes of preceding instruction and practice. It is concluded that the MTPB-approach to selection offers promise as a screening device for air traffic control specialist applicants, but further research is required to establish this as a fact and to determine its utility in terms of cost-effectiveness. (Author) (U)

AD- 741 147 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Experimentation Support for Demonstration of an Automatic Position Reporting Technique at Oakland, California. (U)

DESCRIPTIVE NOTE: Final rept. Jan 70-Jul 71,
APR 72 67P Titherington,Gerald E. ;
Massismino,Michael J. ;Beaty,James S. ;
REPT. NO. FAA-NA-72-28
PROJ: EAA-101-231-01X, FAA-232-001-05X
MONITOR: FAA-RD 71-92

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DATA TRANSMISSION SYSTEMS), INERTIAL NAVIGATION, POSITION FINDING, AUTOMATIC, DISPLAY SYSTEMS, OCEANS, QUESTIONNAIRES (U)
IDENTIFIERS: COMPUTERS, GRAPHICS (U)

The purpose of this project was to demonstrate a concept of air traffic control (ATC) that employs automatic position reporting via data link and associated video displays in the oceanic control sectors of an air route traffic control center (ARTCC). Specific objectives were: (1) to determine the feasibility of automatic position reporting via data link; (2) to determine the conceptual suitability of the test sector for oceanic control; (3) to provide environmental and interfacing information; (4) to provide operational information that would be helpful in the preparation of specifications for further development; and (5) to determine relative controller workloads, flight safety, and system capacities. (Author) (U)

AD- 740 869 12/1 17/7
MASSACHUSETTS INST OF TECH CAMBRIDGE ELECTRONIC SYSTEMS LAB

Control Theory for Large Scale and Uncertain Systems Applicable to Aerospace Systems. (U)

DESCRIPTIVE NOTE: Final rept. 1 Feb 71-31 Jan 72,
MAR 72 43P Athans,Michael ;Mitter, Sanjoy K. ;
REPT. NO. ESL-FR-474
CONTRACT: AF-AFOSR-1941-70
PROJ: AF-9769
MONITOR: AFOSR TR-72-0947

UNCLASSIFIED REPORT

DESCRIPTORS: (*ADAPTIVE CONTROL SYSTEMS, MATHEMATICAL MODELS), (*AIR TRAFFIC CONTROL SYSTEMS, MATHEMATICAL MODELS), DIFFERENTIAL EQUATIONS, STOCHASTIC PROCESSES, DECISION THEORY, UNCERTAINTY, MATRICES(MATHEMATICS), STABILITY, OPTIMIZATION, DYNAMIC PROGRAMMING, FEEDBACK, LINEAR SYSTEMS, WHITE NOISE (U)
IDENTIFIERS: NONLINEAR FILTERING, AUTOMATIC, CONTROL, PARAMETER ESTIMATION, KALMAN-BUCY FILTERS, CONTROL, STOCHASTIC PROCESSES, *CONTROL THEORY, DISTRIBUTED PARAMETER SYSTEMS (U)

The report describes the research carried out by members of the Decision and Control Sciences Group at the Electronic Systems Laboratory, M.I.T. Research was carried out on the following main topics: Control and Decision Making under Uncertainty; Studies in Large-Scale Systems; Control of Distributed Parameter Systems; Control of Hereditary Differential Systems; and Air Traffic Control. Technical details of the research may be found in the reports and papers cited in the references. (Author) (U)

AD- 740 786 17/1 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Transponder Test Program. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 72 71P Colby,G. V. ;Crocker,E. A. ;
REPT. NO. ATC-9
CONTRACT: F19628-70-C-0230, DOT-FA72WAI-242
PROJ: FAA-034-241-012
MONITOR: FAA-RD 72-30

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Project Report on ATC Surveillance/Communication Analysis and Planning.
DESCRIPTORS: (*TRANSPONDERS, RELIABILITY(ELECTRONICS)), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), FLIGHT TESTING, IDENTIFICATION, SEARCH RADAR, REVIEWS (U)
IDENTIFIERS: IDENTIFICATION FRIEND OR FOE (U)

Performance parameters of transponders installed in aircraft were measured to determine their degree of compliance with current specifications. A mobile van was outfitted with electronic test equipment which simulated the transmitter and receiver sections of a ground interrogator and which allowed measurement of transponder parameters. A horn antenna located near the aircraft under test was used to couple signals to and from the transponder. The results of measurements on 504 transponders installed in general aviation aircraft, 17 transponders installed in military aircraft, and 28 transponders installed in air carrier aircraft are reported. (Author) (U)

AD- 740 541 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

Operational Evaluation of an Interim Loop Display System. (U)

DESCRIPTIVE NOTE: Final rept. Sep 69-Dec 71,
APR 72 26P Slattery,Howard F. ; McCombs,Ward ;
REPT. NO. FAA-NA-72-12
PROJ: FAA-144-170-C8X
MONITOR: FAA-RD 72-18

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DISPLAY SYSTEMS), (*DISPLAY SYSTEMS, ACCEPTABILITY), AIR TRAFFIC CONTROL TERMINAL AREAS, LOGIC CIRCUITS, CONTROL PANELS, MAGNETIC FIELDS, DETECTORS, AIR TRAFFIC CONTROLLERS, QUESTIONNAIRES (U)
IDENTIFIERS: EVALUATION (U)

An operational evaluation to determine the feasibility of using an interim loop display system to display surface traffic movements in blind spot areas was conducted at the J. F. Kennedy Airport. Specific objectives were to determine the reliability of the system, determine the operational utility of the displayed data, and identify and document relevant technical and operational data to assist in determining future design requirements. The interim loop display system consisted of a logic unit, a display unit and a remote control box. (Author) (U)

AD- 740 293 17/7
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C OFFICE OF SYSTEMS ENGINEERING MANAGEMENT

Air Traffic Control Radar Systems Definition Report, (U)

MAR 72 77P Moses,Harry C. ;
REPT. NO. FAA-EM-72-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRPORT RADAR SYSTEMS, REVIEWS), SEARCH RADAR, AIR TRAFFIC CONTROL SYSTEMS, OPERATION, COSTS (U)

The report defines the existing air traffic control radars with respect to quantity, type of system, site location, operational function, and performance characteristics. An appendix includes detailed functional block diagrams and additional performance data. (Author) (U)

AD- 739 713 17/7
HONEYWELL INC MINNEAPOLIS MINN SYSTEMS AND RESEARCH DIV

Advanced Carrier-Based Air Traffic Control. (U)

DESCRIPTIVE NOTE: Technical rept. 15 Mar-14 Dec 71 on Phase 1,
MAR 72 89P Zagalsky,Nelson R. ;Curtner, Keith L. ;Irons,Robert P. ;
REPT. NO. F2027-IR1
CONTRACT: N00014-71-C-0265
PROJ: NR-215-188

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OPTIMIZATION), MATHEMATICAL MODELS, NAVAL AIRCRAFT, JET FIGHTERS, SIMULATION, COMPUTER PROGRAMMING (U)
IDENTIFIERS: F-4 AIRCRAFT, DIGITAL SIMULATION (U)

A carrier-based air traffic control system which features enroute trajectory optimization and a computer-aided marshal reassignment procedure is described. The development of the trajectory optimization procedure is followed by a description of a computer simulation to be used as a design tool and for the demonstration of concept feasibility. The simulation model features an F4 mathematical model and an interactive controller's display console. (Author) (U)

AD- 738 298 17/9 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

A Theory for Optimal MTI Digital Signal Processing: Part I. Receiver Synthesis. (U)

DESCRIPTIVE NOTE: Technical note,
FEB 72 69P McAulay,Robert J. ;
REPT. NO. TN-1972-14-Pt-1
CONTRACT: F19628-70-C-0230
PROJ: AF-649L
MONITOR: ESD TR-72-55

UNCLASSIFIED REPORT

DESCRIPTORS: (*MOVING TARGET INDICATORS, *AIR TRAFFIC CONTROL SYSTEMS), (*RADAR TARGETS, TARGET RECOGNITIONS), DOPPLER EFFECT, RADAR CLUTTER, DIGITAL SYSTEMS, TARGET ACQUISITION, PROBABILITY DENSITY FUNCTIONS, STOCHASTIC PROCESSES, WHITE NOISE, INFORMATION THEORY, INTEGRAL TRANSFORMS, NUMERICAL ANALYSIS, MATHEMATICAL MODELS (U)
IDENTIFIERS: AMBIGUITY FUNCTIONS, SIGNAL PROCESSING, FOURIER TRANSFORMATION, DIGITAL FILTERS (U)

A classical problem in radar theory is the detection of moving targets in a ground clutter plus receiver noise background. Improvements in clutter rejection have recently been made by replacing analog MTI processors by their digital equivalents as this eliminates many of the problems associated with the maintenance of the analog hardware. In an attempt to determine the ultimate improvements possible using this new technology, the MTI problem was formulated as a classical detection problem and solved using the generalize likelihood ratio test. By manipulating the likelihood ratio, the receiver could be interpreted as a clutter filter in cascade with a doppler filter bank. The performance of the optimum receiver was evaluated in terms of the output signal-to-interference ratio and compared with well-known MTI processors. It was shown that near-optimum performance can be obtained using a sliding weighted Discrete Fourier Transform (DFT).
(Author) (U)

AD- 737 294 17/7
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Interrogation Scheduling for the Discrete Address Beacon System. (U)

DESCRIPTIVE NOTE: Project rept.,
JAN 72 59P Kelly,E. J. ;
REPT. NO. ATC-8
CONTRACT: F19628-70-C-0230, DOT-FA72WAI-242
PROJ: FAA-034-241-012
MONITOR: FAA-RD 72-7

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), IDENTIFICATION SYSTEMS, SCHEDULING, ALGORITHMS, PHASED ARRAYS, AUTOMATION (U)
IDENTIFIERS: INTERROGATION, DABS(DISCRETE ADDRESS BEACON SYSTEM), DISCRETE ADDRESS BEACON SYSTEMS (U)

The report is an attempt to define the interrogation scheduling problem which arises in the implementation of the discrete address beacon idea. The interfaces of this problem with other parts of the beacon system design are discussed, and several specific algorithms for scheduling are analyzed for both arrays and rotating antennas. (U)

AD- 735 942 15/5 5/10
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

The Development of a Motion Picture Measurement Instrument for Aptitude for Air Traffic Control. (U)

DESCRIPTIVE NOTE: Final rept. Nov 70-Nov 71,
JAN 72 34P Buckley,E. P. ;Beebe,Tom ;
REPT. NO. FAA-NA-72-7
PROJ: FAA-197-641-04X, FAA-012-609-04X
MONITOR: FAA-RD 71-106

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, APTITUDE TESTS), (*CIVIL AVIATION, AIR TRAFFIC CONTROL SYSTEMS), MOTION PICTURES, RELIABILITY, EFFICIENCY, TRAINING FILMS (U)

A motion picture test for aptitude for air traffic control was developed and pretested with 19 air traffic control specialists. The test was developed at the National Aviation Facilities Experimental Center (NAFEC) during this project for use in a project being conducted for Federal Aviation Administration by Education and Public Affairs (EPA). That project report will contain data on use of the test with a much larger sample. This report describes the test and gives estimates of reliability and validity as obtained from the administration of the test to the above-mentioned sample of 19 air traffic control specialists. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 660 198 5/5 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C OFFICE OF AVIATION MEDICINE

DEVELOPMENT AND EVALUATION OF A RADAR AIR TRAFFIC CONTROL RESEARCH TASK, (U)

DEC 65 31P Pearson,Richard G. ;Hunter, Clifton E. ;Neal,Gilbert L. ;
REPT. NO. FAA-AM-65-31

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *HUMAN FACTORS ENGINEERING), (*RADAR EQUIPMENT, AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC CONTROLLERS, TRAINING DEVICES, SYSTEMS ENGINEERING, DESIGN (U)

A system is described in which various elements of the radar air traffic controller's task can be presented repeatedly, reliably, and concurrently to each of six experimental subjects seated at separate task consoles. Programming of display conditions designed to test such operator skills as vigilance, problem solving, monitoring, and reaction time, and the electronic scoring of subject responses are accomplished automatically. Results from initial experimentation involving enroute ATC, terminal, and flight service station personnel support the design rationale for the experimental task. Approximately 8 hr of practice are required for subjects to integrate effectively all subtasks and to achieve a stable level of proficiency. Suggestions are made for use of the system in human factors research on ATC operator problems and for modification as a training device. Technical appendixes include description of a complete problem script and of the electrical-engineering design characteristics of the programming-data-acquisition system. (Author) (U)

AD- 659 999 17/7 17/2
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA SCIENCE AND TECHNOLOGY DIV

NOTES ON CIVIL NAVIGATION AND TRAFFIC CONTROL TECHNOLOGY. (U)

DESCRIPTIVE NOTE: Research paper,
SEP 67 74P Portmann,Pierre A. ;
REPT. NO. RP-P-323
CONTRACT: DAHC15-67-C-0011
TASK: T-49
MONITOR: IDA/HQ 67-5075

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAVIGATION, REVIEWS), (*WATER TRAFFIC, NAVIGATION), (*AIR TRAFFIC CONTROL SYSTEMS, NAVIGATION), (*NAVIGATION SATELLITES, *COMMUNICATION SYSTEMS), COMMUNICATION SATELLITES(ACTIVE), TRAFFIC, CONTROL SYSTEMS, CIVIL AVIATION, RADIO NAVIGATION, FEASIBILITY STUDIES (U)

Current navigation and communication systems in civilian activities satisfy a large number of users both for ship and aircraft activities. A trend toward closer traffic control of both ships and aircraft makes it necessary to consider ways of improving both of these capabilities for future air and sea vehicles. An examination of new system design concepts shows little likelihood of user acceptance from economic or technical considerations. There is a need to develop a system concept which will provide graduated system performance (in accuracy and rate of updating fixes) with a corresponding graduated economic burden. A satellite system is suggested as a means of developing such a capability and some preliminary estimates are made of the technical characteristics required to provide such a system capability. (Author) (U)

AD- 659 523 17/7
UNITED RESEARCH INC CAMBRIDGE MASS

AIR TRAFFIC CONTROL MATHEMATICAL MODEL. (U)

MAY 59 95P
CONTRACT: FAA/BRD-17

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MATHEMATICAL MODELS), AIR TRAFFIC, FLIGHT PATHS, SCHEDULING, MATHEMATICAL PREDICTION, AIR TRAFFIC CONTROL TERMINAL AREAS (U)

Contents: Preparation for operating the model; Operation of the model (the en route decision, the decision at the last en route fix, terminal area decisions); Illustrative examples of the operation of the model; Proposed sources of environmental traffic data for the air traffic control model; Estimating the theoretical capacity of an airport. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 659 035 17/7

FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

NOTES ON THE MEASUREMENT OF CONTROL LOAD AND SECTOR DESIGN IN THE ENROUTE ENVIRONMENT, (U)

JUN 64 177P Arad,Bar-Atid ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendix to the final report of Project 102-11, Control Load, Control Capacity, and Optimal Sector Design, AD-429 906.

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OPERATIONS RESEARCH), AIR TRAFFIC, MEASUREMENT, SYSTEMS ENGINEERING, MATHEMATICAL MODELS, AIR TRAFFIC CONTROLLERS, RADAR, JOB ANALYSIS (U)

The objective was to first establish a mathematical model of the enroute air traffic control sector which faithfully described the operational picture and then to set about obtaining valid numbers to satisfy the equations of the model. The objectives of the effort were to obtain a means of measuring control work and load in the sector and then develop a technique of designing sectors which balanced the load with the capacity of the controllers. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 659 034 17/7 5/3

FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

AIR TRAFFIC CONTROL SYSTEMS COSTS. (U)

DESCRIPTIVE NOTE: Memo. rept.
JUN 62 52P

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COSTS), MAINTENANCE, NAVIGATION, MANAGEMENT PLANNING AND CONTROL, OPERATION, SELECTION, AIRPORTS, SUPERSONIC AIRCRAFT (U)

The report contains information on the estimated costs for the establishment, maintenance and operation of ATC systems, subsystems, facilities, and equipment. It is intended to provide guidance to SRDS personnel engaged in the planning, development, testing and selection of new ATC systems and subsystems. At the present time, there is no central location within the FAA where cost information can be obtained. The document was prepared as a first step in filling that gap. Only major facilities were included in this initial effort. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 658 215 17/7 14/1
UNITED RESEARCH INC CAMBRIDGE MASS

A METHOD FOR DETERMINING THE ECONOMIC VALUE OF AIR TRAFFIC CONTROL IMPROVEMENTS AND APPLICATION TO ALL-WEATHER LANDING SYSTEMS, VOLUME II. (U)

DESCRIPTIVE NOTE: Technical notes.
66 116P
CONTRACT: FAA/BRD-17

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-658 214.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COST EFFECTIVENESS), (*INSTRUMENT LANDINGS, *ALL WEATHER AVIATION), ECONOMICS, COSTS, CIVIL AVIATION, AVIATION SAFETY (U)

Contents: Evaluation of benefits in dollar terms: the economic theory; Estimating the demand for commercial air transport; The effects of price and reliability on demand; Determination of cost effects of improvements; Analysis of probability of avoiding aviation accidents; Methods of estimating the physical gain from new airway and airport facilities; Results of the analysis of delay, diversion, and cancellation; Dollar benefits from all-weather landing system installations; Methods of multivariate regression; Weather at the sample airports during 1957; Sources of data - demand analysis. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 658 214 17/7 14/1
UNITED RESEARCH INC CAMBRIDGE MASS

A METHOD FOR DETERMINING THE ECONOMIC VALUE OF AIR TRAFFIC CONTROL IMPROVEMENTS AND APPLICATION TO ALL-WEATHER LANDING SYSTEMS, VOLUME I. (U)

66 27P
CONTRACT: FAA/BRD-17

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-658 215.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, COST EFFECTIVENESS), (*INSTRUMENT LANDINGS, *ALL WEATHER AVIATION), ECONOMICS, COSTS, CIVIL AVIATION, AVIATION SAFETY (U)

The method as applied to an all-weather landing system concludes the following: Additional demand leading to increased revenues to air carriers, $11,500,000; cost savings to air carriers, $9,379,000; cost savings to general aviation, $292,000; value of accidents prevented, $3,791,000. Since the annual operating costs of an all-weather landing system were not available, the annual net return of this ATC improvement was not calculated. A further conclusion based upon a detailed study of the installation of all-weather landing systems at 22 airports (a stratified sample of all approach control airports in the United States) shows that: 50% of the total dollar benefits would be realized if installations were made at only 14 airports. (Author) (U)

AD- 658 166 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ATC CONCEPTS FOR SUPERSONIC VEHICLES. PART II - 1. (U)

DESCRIPTIVE NOTE: Interim rept.,
AUG 67 75P Sluka,Andrew L. ;
PROJ: FAA-150-512-01X
MONITOR: FAA RD-67-36

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also N67-13246.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SUPERSONIC AIRCRAFT), (*TRANSPORT AIRCRAFT, AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC, DISPLAY SYSTEMS, FLIGHT SIMULATORS, FLIGHT PATHS (U)
IDENTIFIERS: SUPERSONIC TRANSPORTS (U)

The simulation study investigated domestic and oceanic SST operations to and from John F. Kennedy International Airport in a simulated alpha numeric system representing a 1970 ATC environment. The study experimented with ATC aiding SSTs to place acceleration overpressure in sterile or sparsely populated areas, transitioning SSTs to and from parallel one-way track systems above FL 430 and the use of alpha numerics and flight path projection. Results showed that alpha numerics and flight path projection will aid in controlling supersonic operations. More expeditious ATC handling for the SST is possible by the provision of parallel one-way routes whereas the assignment of the same routes to opposite direction SST traffic is undesirable. (Author) (U)

AD- 655 635 14/3 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF RADAR VIDEO RECORDERS. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 67 34P Titherington,Gerald E. ;
PROJ: FAA-231-003-02X
MONITOR: FAA-RD 67-34

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNETIC RECORDING SYSTEMS, VIDEO SIGNALS), (*AIR TRAFFIC CONTROL SYSTEMS, ELECTRONIC RECORDING SYSTEMS), MAGNETIC TAPE, ELECTRONIC RECORDING SYSTEMS, EFFECTIVENESS (U)

A TV tape recorder was evaluated to determine its operational value for recording and reproducing scan converted radar information. Although there is some degradation from the original 'live' display, the video tape record, which is not normally available, does enable personnel to reconstruct air traffic situations completely and accurately. The 'off-the-shelf' test recorder can be adapted to fulfill FAA requirements at Air Traffic Control Facilities having radar surveillance which incorporates the use of scan converters. (Author) (U)

AD- 655 134 17/7 14/1
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA ECONOMIC AND POLITICAL STUDIES DIV

THE NORTH ATLANTIC AIR-TRAFFIC CONTROL SYSTEM: ECONOMIC ANALYSIS OF PROPOSED CHANGES, (U)

SEP 65 150P Skaggs,Allen H. ;Asher, Norman J. ;Halfyard,Richard ;Parker,Elizabeth ;
REPT. NO. S-198
CONTRACT: FA-65-WA-1069
PROJ: FAA-350-103-01A
MONITOR: IDA/HQ,FAA-RD 65-3898,65-95

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, ECONOMICS), ATLANTIC OCEAN, COST EFFECTIVENESS, AIR TRAFFIC, COSTS, FLIGHT PATHS, MANAGEMENT PLANNING AND CONTROL (U)

The study is a cost-benefit analysis to determine the economic impact of implementing certain FAA-specified technical changes to the North Atlantic Air-Traffic Control System. As such, it attempts to determine which system would afford the maximum benefit to the community of countries who provide and use the system. Accordingly, it recommends which among the technically feasible changes in facilities, services, and procedures are economically justified. Two basic types of changes were proposed: additional ground equipment to increase the capacity of the transition areas, and reduction of separation criteria in the oceanic area. The study shows the extent to which various reductions of separation criteria in the oceanic area would reduce the cost of aircraft diversions. Equipment changes in the transition areas are designed to increase the traffic-handling capacities of these areas and thereby to reduce the cost of aircraft delays during peak-flow periods. The study concludes that non-automated surveillance radar coverage should be extended over the entire transition area. (Author) (U)

AD- 653 871 17/7 5/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

IMPROVED EQUIPMENT ARRANGEMENTS FOR TRACON ROOMS. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 66 85P Bradley,J. Roy , Jr;
PROJ: FAA-150-516-01X
MONITOR: FAA-RD 66-22

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color reproducible in black and white only after original supply is exhausted.
DESCRIPTORS: (*AIR TRAFFIC CONTROL TERMINAL AREAS, HUMAN FACTORS ENGINEERING), (*RADAR EQUIPMENT, HUMAN FACTORS ENGINEERING), DISPLAY SYSTEMS, DESIGN, LIGHTING EQUIPMENT, CONFIGURATION (U)

The report presents the results of a research project conducted to recommend environmental and hardware improvements for Terminal Radar Control (TRACON) Rooms. Through the use of laboratory techniques a simulated TRACON room was established to test environmental concepts and equipments. Field controllers' opinions and recommendations, with those of the project members, were used as a basis for determining the advantages or disadvantages of particular equipments, their locations, and console modifications and configurations. Recommendations include: Operating position arrangement concepts; placement of auxiliary equipment and controls; improved lighting techniques and information display devices; and a new design for ATC TRACON room consoles. (Author) (U)

AD- 653 797 17/7
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

A MATHEMATICAL ANALYSIS OF THE PERFORMANCE OF THE ATC RADAR BEACON SYSTEM. (U)

AUG 59 258P Ashley,A. ;
REPT. NO. AIL-5791-12
CONTRACT: FAA/BRD-16
TASK: 12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color reproduced in B/W only after original supply is exhausted.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), (*RADAR BEACONS, PERFORMANCE(ENGINEERING)), MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, TRANSPONDERS, CIRCUITS (U)

A mathematical model representing the current New York environment affecting the capacity of the Air Traffic Control Radar Beacon System was developed for 21 stations to evaluate the effects upon system performance when (1) changes are made in system parameters and (2) various combinations of system improvements are incorporated. The combined effect of all stations on the reply rate from any aircraft in the area is calculated as well as the aircraft information available for display and utilization at the Idlewild enroute beacon station. To indicate the optimum future configurations, the computations are performed for combinations of (1) the basic system and three different sidelobe suppression techniques, (2) receiver subtraction, (3) single and double defruiting, and (4) several decoder settings. Various settings of dead-time, suppress-time, and reply-limit are imposed on each of the combined systems. An interrogation-channel analysis for a 50-station mathematical model is also presented. Additional discussion and analysis is given to anti-cross-moding effects, low-cost transponders, monopulse techniques, and echo-suppression circuitry. (Author) (U)

AD- 653 470 17/7 5/8 5/5
FRANKLIN INST RESEARCH LABS PHILADELPHIA PA

EMPIRICAL HUMAN-FACTORS INVESTIGATION OF DISPLAY DESIGN. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 67 71P Mayfield,Clifton E. ;
CONTRACT: FAA/BRD-423
PROJ: FAA-104-127R
MONITOR: FAA-RD 67-12

UNCLASSIFIED REPORT

DESCRIPTORS: (*INSTRUMENT PANELS, DISPLAY SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, HUMAN FACTORS ENGINEERING), AIR TRAFFIC, SIMULATION, ALTITUDE, AIR TRAFFIC CONTROLLERS, TARGETS (U)
IDENTIFIERS: ALPHANUMERIC SYMBOLS (U)

The report discusses two experiments in which alphanumeric formats for aircraft flight information are compared. Both experiments utilized a nonintervention dynamic simulation of air traffic which has been called 'microsimulation.' The first experiment, performed with low traffic densities, indicated that altitude and climb-descent information could suitably be placed in tabular format if arranged in order of beacon altitude. In this experiment the target-associated identification always remained in the same position with respect to the target. In the second experiment, a tabular format similar to that of Experiment 1 was compared with a full three-line target-associated tag which was flipped to a new position (relative to the target) whenever overwrites were imminent. The only significant differences were related to the variances of conflictions called by the controller subjects, with the tag format yielding larger variabilities than the tabular format. It is suggested that since this tends to cause unnecessary control actions, the tabular format is at least not inferior to the tag format when traffic densities are high as in this experiment. (Author) (U)

AD- 651 299 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C OFFICE OF INTERNATIONAL AVIATION AFFAIRS

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3RD), AUTOMATION IN AIR TRAFFIC CONTROL. SUMMARY OF DISCUSSIONS AND PROGRAM PROGRESS REPORT, HELD AT HADDON HALL HOTEL, ATLANTIC CITY, N. J., NOVEMBER 1-3, 1965. (U)

65 152P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-651 285.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SYMPOSIA, AIR TRAFFIC, COMPUTER PROGRAMMING, DISPLAY SYSTEMS, DESIGN (U)

Contents: Summary of discussions: Technical Session I 'System Design I'; Technical session II 'System design II'; Technical session III 'Subsystem considerations'. Program progress report: 'Air traffic control systems development program'; 'Experimental air traffic control systems development'; 'En route stage a computer programing'; 'National airspace systems display subsystem'; 'Implementation of National Airspace System (NAS) Air Traffic Control Subsystem'. Attendance List. (U)

AD- 651 298 1/2 17/7
FEDERAL AVIATION AGENCY ATLANTIC CITY N J SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3RD), AGENDA, HELD AT ATLANTIC CITY, N. J., NOVEMBER 1-3, 1965. (U)

65 35P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-600 093.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SYMPOSIA), (*ALL WEATHER AVIATION, SYMPOSIA), AVIATION SAFETY, DATA PROCESSING, COMPUTERS, FLIGHT INSTRUMENTS, RADAR NAVIGATION, LANDING AIDS (U)

The third international aviation research and development symposium, November 1-3, 1965, at Atlantic City, N. J., presented technical papers on air traffic control systems and automatic data processing. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 651 293 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C OFFICE OF INTERNATIONAL AVIATION AFFAIRS

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3RD), AUTOMATION IN AIR TRAFFIC CONTROL. TECHNICAL PAPERS, SESSION I: SYSTEM DESIGN I, HELD AT HADDON HALL HOTEL, NOVEMBER 1-3, 1965. (U)

65 84P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-651 284.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SYMPOSIA, DATA PROCESSING, AIR TRAFFIC CONTROLLERS, JOB ANALYSIS, FLIGHT PATHS, AIR TRAFFIC, DISPLAY SYSTEMS, COMPUTERS, EUROPE (U)

Contents: Digitalization of primary and secondary radar and automation methods as they will be applied to the Upper ATC Center for Belgium, Netherlands, and North Germany, by R. H. G. Martin; Air traffic control simulation and automatic data processing studies--the role of the Eurocontrol Experimental Center, by D. Lipman; Evaluation of computer facilities for oceanic control, by H. Cherry; The approach to automating ATC in France, by J. Villiers; The Question - What to automate, by R. Bierman. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 651 285 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C OFFICE OF INTERNATIONAL AVIATION AFFAIRS

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3RD), AUTOMATION IN AIR TRAFFIC CONTROL. TECHNICAL PAPERS, SESSION III: SUBSYSTEM CONSIDERATIONS, HELD AT HADDON HALL HOTEL, NOVEMBER 1-3, 1965. (U)

65 84P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-651 284 and AD-651 299.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SYMPOSIA, RADAR EQUIPMENT, TRACKING, AIRCRAFT, COMPUTERS (U)

Contents: The use of the 'control load model' for possible determination of the benefits of automation in a controlled en route environment, by B. A. Arad; The application of automation to the solution of ATC problems, by M. Rosenshine; Prospects and experimentation of radar data handling at the Orly Regional Control Center (Orly ATCC), by P. Gufflet; The IBM 9020 - a modular multi-processing system for NAS, by J. R. Wood; Automatic tracking of aircraft, by B. W. Oakley; Primary and secondary radar data processing under varying clutter conditions, by J. A. Lifsey. (U)

AD- 651 284 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C OFFICE OF INTERNATIONAL AVIATION AFFAIRS

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM (3RD), AUTOMATION IN AIR TRAFFIC CONTROL. TECHNICAL PAPERS, SESSION II, SYSTEM DESIGN II, HELD AT HADDON HALL HOTEL, NOVEMBER 1-3, 1965. (U)

65 71P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-651 293 and AD-651 285.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), SYMPOSIA, JAPAN, GREAT BRITAIN, AIR TRAFFIC, COMPUTERS, DISPLAY SYSTEMS, DATA PROCESSING, DESIGN (U)

Contents: ATC automation in Japan, by M. Okada; The planned implementation of computer directed displays in ATC, by R. Maier; A survey of experiences with the SATCO system, by J. S. Smit; Current plans for ATC data processing in the U.K., by R. E. Cox; Benefits accruing to the users due to ATC automation, by S. Seltzer; NAS design concepts and system configuration, by N. A. Blake. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 651 158 17/7 1/5
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

DALLAS/FT. WORTH REGIONAL AIRPORT SIMULATION STUDY. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 67 55P Conway,Robert C. ;
PROJ: FAA-154-002-01X
MONITOR: FAA-RD 67-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, SIMULATION), TEXAS, TERMINAL FLIGHT FACILITIES, AIRPORTS, CONTROL SIMULATORS (U)

Simulation studies of a plan developed for the control of air traffic when a proposed Regional Airport is operational were conducted. The simulation was conducted using the Model A and Model B Dynamic Air Traffic Control Simulators. Six different combinations of runway usage were tested in evaluating the plan. It was concluded that the plan as modified was capable of accommodating the 1980 traffic during a north or south traffic flow. However, during a northwest or southeast traffic flow this capability did not exist. It was also concluded that the location and associated runway alignment of the proposed Regional Airport and the proposed VORTACs were compatible to the overall terminal area IFR traffic flow. It was recommended that consideration be given to using the modified plan for the control of air traffic when the proposed Regional Airport is operational. (Author) (U)

AD- 651 033 17/7 5/5 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

HUMAN FACTORS EVALUATION OF A LARGE SCREEN RADAR DISPLAY. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 67 36P Paul,Lee E. ;Buckley, Edward P. ;
PROJ: FAA-130-333-02X
MONITOR: FAA-RD 66-105

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *PLAN POSITION INDICATORS), DISPLAY SYSTEMS, HUMAN FACTORS ENGINEERING, RADAR IMAGES, AIR TRAFFIC CONTROLLERS, FLIGHT PATHS (U)
IDENTIFIERS: EVALUATION (U)

A Controller Decision Evaluation (CODE) experiment was performed to compare a 20-inch horizontal individual display with an 8 by 10 foot Eidophor projected group display in the terminal environment. Sixteen subjects used each display for four 90-minute sessions. No significant differences between displays were found in either the number of conflictions missed or the number of unnecessary control actions taken. It was concluded that there is nothing inherent in the large common display that would preclude it from use as an air traffic control display. A discussion of a number of factors that should be considered in such a use is given. (Author) (U)

AD- 651 026 17/7
WILCOX ELECTRIC CO INC KANSAS CITY MO

FEASIBILITY OF AREA MAINTENANCE CONCEPT WITH SELF-CONTAINED TEST VEHICLE FOR USE ON LOW COST INSTRUMENT LANDING SYSTEMS. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 66 129P Staehling,David ;
CONTRACT: FA-65-WA-1272
PROJ: FAA-320-101-02N
MONITOR: FAA-RD 66-104

UNCLASSIFIED REPORT

DESCRIPTORS: (*INSTRUMENT LANDINGS, INSTRUMENTATION), (*AIR TRAFFIC CONTROL SYSTEMS, MAINTENANCE), TERMINAL FLIGHT FACILITIES, FEASIBILITY STUDIES, TEST EQUIPMENT, COSTS, MAINTENANCE VEHICLES (U)

The report presents the results of a study to determine how a test vehicle might be used to accomplish on-site periodic maintenance on Low Cost ILS equipment. The chief purpose of the vehicle would be to transport test equipment and unit spares to the site in conjunction with the secondary purpose of providing shelter during maintenance. The transportation aspect (area maintenance) was explored in detail. ILS candidate airports were plotted on a map, and a sample maintenance area was studied from a simulated maintenance schedule. It was concluded that the area maintenance system is highly advantageous and should be implemented as soon as an ILS design for this type of maintenance is available. The report includes specifications and guidelines for development of a Low Cost ILS System which is compatible with the area maintenance concept. (Author) (U)

AD- 650 910 1/5
BURROUGHS CORP PAOLI PA CONTROL INSTRUMENT DIV

GUIDE-LITE HELIPORT SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 65 43P Hain,Eugene T. ;
CONTRACT: FA-WA-4534
PROJ: FAA-430-206-01E
MONITOR: FAA-RD 65-57

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELIPORTS, *AIR TRAFFIC CONTROL SYSTEMS), (*APPROACH INDICATORS, GUIDANCE), HELICOPTERS, LANDING, APPROACH LIGHTS, LANDING AIDS, LANDING LIGHTS, LIGHTING EQUIPMENT, CONTROL PANELS (U)

A detailed description is given of the design and construction of a ground-based visual landing aid for helicopters. The purpose of the device is to identify the landing site and indicate the proper landing path and approach velocity. The unit is operational and will be flight tested and evaluated by the FAA. (U)

AD- 650 865 17/7 17/9
HAZELTINE ELECTRONICS DIV HAZELTINE CORP LITTLE NECK N Y

ALPHA NUMERIC SYMBOL GENERATION EQUIPMENT. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 65 103P O'Connor,J. F. ;
CONTRACT: FA-WA-4345
PROJ: 121-321-01A, 122-32-101A
MONITOR: FAA-RD 65-103

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *PLAN POSITION INDICATORS), (*SYMBOLS, DISPLAY SYSTEMS), GENERATORS, NUMBERS, RADAR EQUIPMENT, CIRCUITS, RADAR IMAGES, FLIGHT PATHS (U)
IDENTIFIERS: ALPHANUMERIC SYMBOLS (U)

Two Alpha Numeric Generator equipments in the FAA Atlanta and Indianapolis Air Traffic Control Centers passed all acceptance tests and are undergoing operation testing. These Alpha Numeric Generators electronically label aircraft radar blips on air traffic controller's displays with identity, altitude, vector, speed, and other data. The use of the Alpha Numeric Generators in the ARTS and SPAN air traffic control systems automates former manual functions of the controllers, reduces the necessary communications with aircraft pilots, and minimizes the possibilities of errors in air traffic control. A summary of development problems and test results on the Alpha Numeric Generators is given. (Author) (U)

AD- 650 835 17/7 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF SLATE III MARK I. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 65 31P Waldmann,Robert A. ;
PROJ: FAA-242-006-01V
MONITOR: FAA-RD 65-135

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSPONDERS, *AIR TRAFFIC CONTROL SYSTEMS), (*RADAR BEACONS, TRANSMISSION LINES), OPERATION, AIRPORT RADAR SYSTEMS, TRANSMITTER RECEIVERS, FLIGHT TESTING, ENVIRONMENT, OPERATION (U)

An evaluation of a Small Lightweight Altitude Transmission Equipment, SLATE III Mark I was conducted to determine its suitability for operation in present and proposed air traffic control environments. Flight tests were conducted in the Advanced Radar Traffic Control System (ARTS) environment at the Atlanta Terminal Facility, Atlanta, Georgia, and the Stored Program Alpha-Numeric (SPAN) System environment at the Indianapolis Air Route Traffic Control Center, Indianapolis, Indiana. In addition, a short series of bench tests were conducted at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey. It was concluded that the SLATE III Mark I is suitable for operation in present and proposed air traffic control environments. It was recommended the Federal Aviation Agency promote, within the general aviation community, the use of radar beacon transponders having capabilities similar to the SLATE III Mark I. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 650 832 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

AREA CONVERAGE DISPLAYS AND COURSE LINE COMPUTERS EXPERIMENTATION. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 65 92P Adams,G. ;Brandewie,D. ;
Harter,R. ;
PROJ: FAA-115-7X
MONITOR: FAA-RD 65-117

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DISPLAY SYSTEMS), (*RADIO NAVIGATION, FLIGHT TESTING), RADIO RECEIVERS, DISTANCE MEASURING EQUIPMENT, AIR TRAFFIC CONTROLLERS, ACCURACY, NAVIGATION COMPUTERS, SIMULATION (U)
IDENTIFIERS: VORTAC (U)

Pictorial displays and course-line computers, driven by VORTAC receivers, were tested to appraise the value of area navigation in the Air Traffic Control System. Technical and operational aspects were tested in fixed-wing aircraft and by simulation in the laboratory. The report touches on results from simulation but concentrates on the description of flight tests. From Air Traffic Control simulations, it was concluded that the controller workload may be reduced and his ability to manipulate traffic increased. Flight tests proved that the addition of area displays to VORTAC receivers enhances the usefulness of DME in VORTAC. Off-radial flight accuracies are comparable to the now existing radial accuracies. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 650 824 17/7 17/9
WHITTAKER CORP NORTH HOLLYWOOD CALIF ELECTRONICS DIV

ATCBI INDICATOR SITE IMPROVEMENTS MODELS ATCBI-2 AND ATCBI-3. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 65 99P Hale,Frank V. , Jr;
CONTRACT: FA-WA-4706
PROJ: FAA-242-005-02
MONITOR: FAA-RD 65-132

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 823.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR EQUIPMENT), RADAR BEACONS, AIRPORT RADAR SYSTEMS, MODIFICATION KITS, RADAR TRANSMITTERS (U)

A modification program was initiated for the ATCBI Indicator Site equipment in accordance with Federal Aviation Agency Specification FAA-E-2002a. This specification required certain operating characteristics be altered and other operational capabilities be added to both the ATCBI-2 Indicator Site Equipment Group and the ATCBI-3 Indicator Site Equipment Group. This equipment was successfully modified to meet the full requirements of specification FAA-E-2002a, and the end result of this program was modification kits suitable for field installation in the basic equipment. A separate modification kit was produced for installation in the ATCBI-2 Indicator Site Equipment Group and in the ATCBI-3 Indicator Site Equipment Group. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 650 823 17/7 17/9
WHITTAKER CORP NORTH HOLLYWOOD CALIF ELECTRONICS DIV

ATCBI TRANSMITTER SITE IMPROVEMENTS MODEL ATCBI-3. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 65 58P Hale,F. V. , Jr;
CONTRACT: FA-WA-4707
PROJ: FAA-242-001-01
MONITOR: FAA-RD 65-118

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 824.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR EQUIPMENT), RADAR BEACONS, AIRPORT RADAR SYSTEMS, MODIFICATION KITS, RADAR TRANSMITTERS (U)

A modification program was initiated for the ATCBI Transmitter Site equipment in accordance with Federal Aviation Agency Specification FAA-R-1404a. This specification required certain operating characteristics be altered and other operational capabilities be added to the ATCBI-3 Transmitter Site Equipment Group. Maximum transmitter output power was increased, side-lobe suppression pulse generation and monitoring circuits were added, three-mode interlace operation was added, output rf switching between a directional and omnidirectional antenna was added, ancillary trigger outputs were added, and certain local control functions were deleted. This equipment was successfully modified to meet the full requirements of specification FAA-R-1404a, and the end result of this program was a modification kit suitable for field installation in the basic equipment. (Author) (U)

AD- 650 615 17/9
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

LOW-COST WEATHER-CONTOURING DEVICE. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 66 67P Bradley,Anthony D. ;
PROJ: FAA-241-001-01X
MONITOR: FAA-RD 66-80

UNCLASSIFIED REPORT

DESCRIPTORS: (*METEOROLOGICAL RADAR, *AIR TRAFFIC CONTROL SYSTEMS), HIGH ALTITUDE, WEATHER COMMUNICATIONS, TEST EQUIPMENT, COSTS, DESIGN, PERFORMANCE(ENGINEERING), TEST METHODS (U)

A low-cost weather-contouring device was developed for use by the Air Route Traffic Control Center (ARTCC) high-altitude radar controller. The design and performance characteristics are given and the proposed Electronic Equipment Modification (EEM) are presented. It was concluded that the requirement to present contoured weather to the high-altitude controller positions can be met through the use of this low-cost device; and it was recommended that this operational capability be considered for introduction into the ARTCC as a modification to the RBDE-5 system. (Author) (U)

AD- 650 565 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

OPERATIONAL EVALUATION OF DME CO-LOCATED WITH ILS FACILITIES. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 67 64P Levy,J. ;Cervi,J. J. ;
Hallenbeck,W. H. ;
PROJ: FAA-150-517-01X
MONITOR: FAA-RD 66-98

UNCLASSIFIED REPORT

DESCRIPTORS: (*DISTANCE MEASURING EQUIPMENT, *INSTRUMENT LANDINGS), (*AIR TRAFFIC CONTROL SYSTEMS, DISTANCE MEASURING EQUIPMENT), PILOTS, EFFECTIVENESS, TERMINAL GUIDANCE (U)
IDENTIFIERS: EVALUATION (U)

The operational utility and potential of DME co-located at Instrument Landing System (ILS) glide slope sites was evaluated at seven airports. Procedures based on DME at ILS were established and published. Questionnaires were developed and distributed to the pilot user groups and air traffic control personnel at the selected airports in order to obtain data based on user experience. The primary advantage of DME at ILS is to the pilot user group and provides benefits to all categories of pilots. Advantage to the Air Traffic Control system is realized through more efficient utilization of air space by pilots and the availability of positive aircraft position for use in the control function. There was general consensus that DME could contribute to improved safety at any of the types of locations involved in the evaluation. It is concluded from the evaluation that the use of DME at ILS provides (1) positive distance information in the approach phase which supplies continuity for departure and enroute flight; (2) improved ILS approach procedures; (3) simplified cockpit procedures; and (4) a reduced pilot workload. It is recommended that the use of DME at ILS be expanded to other selected airports, particularly wherein siting of navigational aids is difficult or prohibitive due to mountainous terrain. (U)

AD- 650 209 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART J: APPENDICES I THRU IV, VOLUME V. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 259P
REPT. NO. CSI-66-TR-2148-Vol-5
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 198 and AD-650 208.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

This volume covers the following: identification of parameters of A/G/A communication subsystem and its operating environment; data gathering experiments; computer program document for air traffic/communication traffic statistical analysis; and preliminary statistical data on air and communication traffic. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 650 208 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART J: APPENDICES V THRU XIV, VOLUME VI. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 240P
REPT. NO. CSI-66-TR-2149-Vol-6
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 209.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

This volume covers the following: a mathematical model of channel utilization in terms of single aircraft parameters in low altitude airspace; a mathematical model of channel utilization in terms of single aircraft parameters in high altitude sectors; data tabulations, single aircraft positions; data summary, one hour time slices, terminal; recomputation of confidence intervals; air traffic projections, 1970-75; calculations of changes in channel demand due to ATC factors impacting on communications; and techniques for possible application in the synthesis of an optimum ATC A/G/A communications subsystem. (U)

AD- 650 202 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART A: INTRODUCTION; PART F: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS, VOLUME I. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 106P
REPT. NO. CSI-66-TR-2144-Vol-1
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 201.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

A sample of air and communication traffic data was taken from normally busy terminal and enroute controller positions in the FAA Eastern Region during selected heavy traffic periods. The raw data, taken from flight strips and communication tapes, was reduced using a computer program developed for the purpose. An analysis identified significant relationships between air traffic and communication traffic. The impact on communication traffic of other ATC environmental factors was also studied. Based on this analysis and on best available predictions of the future ATC environment and air traffic, post 1972 A/G/A communication traffic demands were projected. A communication subsystem capable of supporting this traffic and satisfying other requirements of future ATC A/G/A communications was synthesized. The necessary hardware is within the state of the art, but for the most part still requires development. A feasible, phased implementation plan for the development and introduction of the future subsystem is presented, together with preliminary budgetary cost estimates for the program. (Author) (U)

AD- 650 201 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART B. CHARACTERIZATION OF THE PRESENT ATC A/G/A COMMUNICATION SUBSYSTEM AND ITS ENVIRONMENT. VOLUME II. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 361P
REPT. NO. CSI-66-TR-2145-Vol-2
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 202 and AD-650 147.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

This volume covers the following: preliminary study effort; statistical data gathering and processing; ATC procedures and flight rules; qualitative characterization of present A/G/A communication subsystem; and quantitative characterization of present center A/G/A communication subsystem. (U)

AD- 650 198 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PARTS C, D, E, G, H. VOLUME IV. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 315P
REPT. NO. CSI-66-TR-2147-Vol-4
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 147 - AD-650 209.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

This volume covers the following: air/ground/air communications requirements for the 1970/75 time period; study and design synthesis of an A/G/A communication subsystem design; and simulation modeling investigation. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 650 147 17/7 17/2.1
COMMUNICATION SYSTEMS INC PARAMUS N J

FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART B. CHARACTERIZATION OF THE PRESENT ATC A/G/A COMMUNICATION SUBSYSTEM AND ITS ENVIRONMENT. VOLUME III. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 66 351P
REPT. NO. CSI-66-TR-2146-Vol-3
CONTRACT: FA-WA-4645
MONITOR: FAA-RD 66-16-Vol-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-650 201, AD-650 198.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS), DATA, AIR TRAFFIC, PREDICTIONS, FEASIBILITY STUDIES, COSTS, AIR TRAFFIC CONTROL TERMINAL AREAS, COMMUNICATION EQUIPMENT (U)

This volume covers the following: quantitative characterization of present terminal area A/G/A communication subsystem; and communication traffic flow and performance. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 649 262 5/9
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROBLEMS IN AIR TRAFFIC MANAGEMENT. VII. JOB AND TRAINING PERFORMANCE OF AIR TRAFFIC CONTROL SPECIALISTS--MEASUREMENT, STRUCTURE, AND PREDICTION, (U)

JUL 65 19P Trites,David K. ;Miller,M. Clinton ;Cobb,Bart B. ;
MONITOR: FAA AM-65-22

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, TRAINING), JOB ANALYSIS, APTITUDE TESTS, PERFORMANCE(HUMAN), AIR TRAFFIC CONTROL SYSTEMS, FACTOR ANALYSIS, PREDICTIONS, SUPERVISORS (U)

A statistical study of training- and job-performance measures of several hundred Air Traffic Control Specialists (ATCS) representing Enroute, Terminal, and Flight Service Station specialties revealed that training-performance measures reflected: (1) performance in the training laboratories; (2) academic performance; and (3) instructors' opinions. In the job-performance area, supervisors seemed to be evaluating (1) overall performance of an ATCS; (2) his interpersonal orientation; (3) job orientation; (4) job potential; (5) job performance; and (6) emotional stability. By examining the practicability of the job-performance measures by training performance, aptitude tests, previous job-relevant experience, and demographic characteristics, evidence was elicited that: (1) the ATCS specialties differ in the characteristics required for job performance; (2) Terminal supervisors more consistently evaluate their ATCS in comparison with Enroute supervisors; (3) opinions of the ATCS training-course instructors are the best predictors of subsequent job performance; and (4) aptitude tests, previous job-relevant experience, and age at entry into training are related to job performance but not at very high levels. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 647 827 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

FIELD APPRAISAL OF THE STORED PROGRAM ALPHA NUMERIC BEACON SYSTEM (SPAN). (U)

DESCRIPTIVE NOTE: Appendix to final rept.,
NOV 66 122P Levy,Joseph ;
PROJ: FAA-122-521-01X
MONITOR: FAA RD-66-53

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-646 146.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *DISPLAY SYSTEMS), (*RADAR BEACONS, DISPLAY SYSTEMS), RADAR EQUIPMENT, RADAR TRACKING, COMPUTER PROGRAMS, DATA PROCESSING, INPUT OUTPUT DEVICES, AIR TRAFFIC CONTROLLERS, CONTROL PANELS (U)

The field appraisal of the Stored Program Alpha-Numeric Beacon System (SPAN) was conducted, using the high altitude airspace, at the Indianapolis ARTC Center between April 1965 and February 1966. The primary objective of the appraisal was to determine firm operational and technical requirements for a semi-automatic data processing and data display system designed to track radar beacon targets and present associated alpha-numeric flight data on enroute radar control displays. The track format handoff capability was one of the primary operational advantages of the system. Improvements to the tracking logic are necessary to minimize track coasting, especially in large turns, and to eliminate track format exchange. With minor exceptions, the displayed data and the display controls were found to be satisfactory. Problem areas included controller input workload, beacon data processing and the resulting tracking performance, and equipment reliability. During the appraisal period, maintenance procedures were altered and modifications to the computer program and alpha-numeric generator were made as necessary to improve the reliability and utility of the system. (Author) (U)

AD- 646 913 17/7 17/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

TECHNICAL EVALUATION OF EIDOPHOR. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 66 52P Woodson,Floyd B. ;
PROJ: FAA-150-511-02X
MONITOR: FAA-RD 66-69

UNCLASSIFIED REPORT

DESCRIPTORS: (*TELEVISION DISPLAY SYSTEMS, *AIR TRAFFIC CONTROL SYSTEMS), TELEVISION EQUIPMENT, RADAR EQUIPMENT, DISPLAY SYSTEMS, FEASIBILITY STUDIES (U)
IDENTIFIERS: EIDOPHOR TELEVISION PROJECTORS, EVALUATION (U)

A technical evaluation of the Eidophor large screen TV display was performed. The purpose of the evaluation was to determine the equipment suitability for implementation into the air traffic control environment. The areas of concern included display quality, equipment reliability and maintainability, projector layout, screen selection and size, interfaces with existing equipments, a system performance in an anticipated equipment configuration, and an ambient lighting system for viewing areas. It was concluded that the Eidophor is suitable for use in the air traffic control environment. Recommendations are made for equipment modifications to better the interface with existing equipments. Guidelines are established planning layout and maintenance. Documentation requirements are established. An ambient lighting system is recommended. References is made to the literature for application data. (Author) (U)

AD- 646 877 9/5 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

IMPROVED ATC TRANSPONDER ANTENNA PERFORMANCE. (U)

DESCRIPTIVE NOTE: Technical rept.,
DEC 66 22P Wise,Kenneth ;
REPT. NO. FAA-RD-66-103
PROJ: FAA-242-006-09C

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT ANTENNAS, TRANSPONDERS), (*AIR TRAFFIC CONTROL SYSTEMS, ANTENNAS), PERFORMANCE(ENGINEERING), RADAR BEACONS, ANTENNAS (U)

The document describes the results of a study to determine the best way to improve the performance of the ATC transponder antenna. The background of the problem is presented and the advantages and disadvantages of some of the many solutions, past and present, are discussed. A strong recommendation is made for a combined transponder/antenna system approach as the solution to the problem. The details of the proposed approach are presented in the form of an engineering requirement suitable for development effort. (Author) (U)

AD- 646 874 17/9 17/7
FEDERAL AVIATION AGENCY WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

THE USE OF RADAR GATING DEVICES FOR REJECTION OF FALSE ATCRBS REPLIES. (U)

DESCRIPTIVE NOTE: Technical rept.,
JAN 67 11P Herrmann,Joseph E. ;
REPT. NO. FAA-RD-67-1
PROJ: FAA-242-001-01C

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADAR BEACONS, *AIR TRAFFIC CONTROL SYSTEMS), PERFORMANCE(ENGINEERING), RADAR EQUIPMENT, ANTENNA LOBES, SUPPRESSORS, INHIBITION (U)

In addition to valid targets, the Air Traffic Control Radar Beacon System is susceptible to signal reflections that produce false signals. The effect is most noticeable at terminal facilities where airport buildings and other structures are close to the beacon antenna site. Some long range sites may also experience reflections to a lesser degree. The Agency program for implementation of side lobe suppression is directed towards a solution of the reflection problem. Technical tests have confirmed that SLS is effective and most reflections will be suppressed. Civil transponders have SLS capability today, but military transponders will not be fully updated until 1972. When operational precautions are taken, the interim use of special beacon gating devices that rely on primary radar signals is justified at some sites until SLS is implamented. (Author) (U)

AD- 646 766 17/2 17/7 4/2
WESTINGHOUSE ELECTRIC CORP BALTIMORE MD

WEATHER INFORMATION REMOTING AND DISPLAY SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 66 73P Spangler,M. J. ;
CONTRACT: FA-64-WA-5256
PROJ: 205-001A
MONITOR: FAA-RD 66-85

UNCLASSIFIED REPORT

DESCRIPTORS: (*WEATHER COMMUNICATIONS, *AIR TRAFFIC CONTROL SYSTEMS), DISPLAY SYSTEMS, WEATHER, ALL WEATHER AVIATION, METEOROLOGICAL RADAR, DATA PROCESSING (U)

The object of the program was to design, develop, fabricate, test and check out a complete Weather Information Remoting and Display System (WIRDS) which will provide the capability of presenting current weather information in a form suitable for an air traffic controller to direct aircraft around hazardous weather phenomena. An experimental system was developed and placed in operation. This system provides a means for compiling data at the weather forecasting site from either a weather radar or other data sources, transferring this information to remote locations via a narrow bandwidth communication facility and converting it to a format suitable for insertion onto the Air Traffic Controller's radar display (RBDE-5). (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 646 147 17/7 9/5
WILCOX ELECTRIC CO INC KANSAS CITY MO

DESIGN AND DEVELOPMENT OF ILS MONITOR ADAPTER TYPE 5479X/6. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 66 16P Kelly,Silas W. ;
CONTRACT: FA-WA-4453
PROJ: 320-102-0IN(114-32)
MONITOR: FAA-RD 66-93

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-646 143.
DESCRIPTORS: (*MONITORS, *AIR TRAFFIC CONTROL SYSTEMS), COUPLING CIRCUITS, LANDING AIDS, TERMINAL GUIDANCE, GLIDE PATH SYSTEMS, INSTRUMENT FLIGHT, POWER SUPPLIES, DESIGN, PERFORMANCE(ENGINEERING) (U)

The object of the project was to build eight 5479X Monitors and four 5479X/1 Power Supplies as previously designed. Sixteen dual adapter units were to be developed and produced to permit the 5479X Monitor to be used in a near field monitoring system with the TRF Type field detectors now in use. The adapter was designed with maximum reliability and simplicity to operate in either localizer or glide slope function without degradation of the system. The two separate sections were designed so that for some future application they may be mounted in the 5479X Monitor with a minimum of modification to the monitor. The ILS Monitor Adapter is thus a simple unit that will permit the complex dual conversion detectors to be replaced by a simple TRF type for near field monitoring purposes. The Adapter has been thoroughly tested and evaluated with the 5479X Monitor as a system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 646 143 17/7
WILCOX ELECTRIC CO INC KANSAS CITY MO

DESIGN AND DEVELOPMENT OF A CATEGORY III ILS MONITOR. (U)

DESCRIPTIVE NOTE: Final rept.,
NOV 66 98P Owens,Neal ;
CONTRACT: FA-WA-4453
PROJ: 320-102-0IN(114-32)
MONITOR: FAA-RD 66-94

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-646 147.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *MONITORS), LANDING AIDS, TERMINAL GUIDANCE, GLIDE PATH SYSTEMS, DESIGN, INSTRUMENT FLIGHT, PERFORMANCE(ENGINEERING) (U)

The object of the project was to develop a receiver type monitor to operate as an integral part of the proposed Federal Aviation Agency's All-Weather Landing System. The monitor was designed with optimum reliability, flexibility, and stability in order to attain the highest degree of safety for aircraft operating to the lowest minimal. The most advanced techniques within the state of the art were employed within the monitor. Also, the monitor was designed so that it could be incorporated into either the localizer or glide slope system. Each monitor system is composed of three units, with one unit containing the rf-if-detector circuits, one unit containing the audio and alarm circuitry, and the third consisting of the monitor power supply. The audio and alarm unit is identical for both localizer and glide slope operation, whereas the rf-if-detector units have been specifically designed for localizer or glide slope respectively. The ILS Monitor was evaluated for performance, and the final design thoroughly tested. (Author) (U)

AD- 646 051 17/7 17/9
AIRBORNE INSTRUMENTS LAB MELVILLE N Y

ESTIMATED INTERROGATION EFFICIENCY IN THE ATC RADAR BEACON SYSTEM WITH VARIOUS SIDE-LOBE SUPPRESSION TECHNIQUES. (U)

JAN 59 119P Battle,F. H. ;Ashley,A. ;
REPT. NO. AIL-4659-1
CONTRACT: NOas-57-884

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS), EFFICIENCY, MATHEMATICAL MODELS, IDENTIFICATION SYSTEMS, TRANSPONDERS, ANTENNA LOBES, ATTENUATION (U)

A mathematical model representing the 1960 New York environment affecting Air Traffic Control Radar Beacon System capacity was developed to evaluate the effects of changes in system parameters. Computations were based on the geographical coordinates of existing ground stations and of a realistic pattern of air traffic. The combined effect of all stations on the reply rate from each aircraft was calculated. Interrogation efficiencies, averaged over a short time interval, were predicted for the basic system and for three side-lobe suppression techniques with various ADC reply-limit and transponder dead-time settings. (Author) (U)

AD- 644 715 17/7 1/3 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ATC CONCEPTS FOR SUPERSONIC VEHICLES - PART I. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 66 67P Sluka,Andrew L. ;
PROJ: 150-512-01X
MONITOR: FAA-RD 66-62-Pt-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, SUPERSONIC AIRCRAFT), (*SUPERSONIC AIRCRAFT, SUPERSONIC FLIGHT), TRANSPORT AIRCRAFT, DISPLAY SYSTEMS, HANDLING, NAVIGATION, FLIGHT PATHS, FLIGHT SIMULATORS, SONIC BOOM, WAKE, TURBULENCE (U)

This report describes dynamic simulation studies which are a part of a joint Federal Aviation Agency (FAA) and National Aeronautic and Space Administration (NASA) simulation program to determine what impact the Supersonic Transport (SST) will have on the Air Traffic Control (ATC) System, as well as the Air Traffic Control System impact on the supersonic transport operating characteristics. The simulation studies conducted at NAFEC, tested three ATC systems; Present, Experimental and Pictorial Display. These systems investigated current and special control procedures, increased separation standards, high and low priority handling, and pictorial display navigation capability for SSTs. A supersonic transport flight simulator located at NASA, Hampton, Virginia, and the FAA ATC simulators at Atlantic City, New Jersey, were tied together for these studies. Actual performance and handling characteristics of a fixed and variable sweep supersonic transport configuration were simulated. Results showed that penalties in the form of delay and reduced operation rates were incurred by other air traffic in each system in which increased separation standards and high priority treatment were provided to the SSTs. Low priority treatment and present day separation standards offer the most acceptable compromise between rigid SST priority and the flexibility needed by the ATC system. (U)

AD- 644 417 17/7 1/2
LOCKHEED-GEORGIA CO MARIETTA

PLAN FOR THE DEVELOPMENT OF ALL WEATHER LANDING SYSTEM RELIABILITY ANALYSIS AND CRITERIA, PHASE I, (U)

JAN 66 117P Adkins,L. A. ;Schiller,L. D. ; Thatro,M. C. ;
REPT. NO. ER-8316
CONTRACT: FA-1376
PROJ: FAA-320-207-01N
MONITOR: FAA-RD 66-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RELIABILITY), LANDING, SYSTEMS ENGINEERING, AVIATION SAFETY, INSTRUMENT LANDINGS, HUMAN FACTORS ENGINEERING, BIBLIOGRAPHIES (U)

The report outlines the basic plan and approach which will be used for generation of an AWLS assessment criteria and evaluation methodology. The criteria and methodology to be formulated will be for application on the Category III AWLS ground-based system, which will be Phase II of the study program, and for the airborne portions of the system, which will be treated in Phase III of the program. Of particular significance is the consideration of safety, reliability, and total performance evaluation. The Phase I Report presents a complete bibliography on AWLS technology. In addition, treatment is presented on the applications of reliability, human factors, safety, quantification, and total performance for the evaluation of All Weather Landing Systems. (Author) (U)

AD- 643 258 17/9 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

A STUDY OF RADAR METEOROLOGICAL FINDINGS RELATED TO RADAR WEATHER DETECTION AND AIR TRAFFIC CONTROL. (U)

DESCRIPTIVE NOTE: Final rept.,
OCT 66 75P Sause,Robert J. ;
PROJ: 241-001-01X
MONITOR: FAA-RD 66-65

UNCLASSIFIED REPORT

DESCRIPTORS: (*METEOROLOGICAL RADAR, *AIR TRAFFIC CONTROL SYSTEMS), METEOROLOGICAL PHENOMENA, SEARCH RADAR, RADAR REFLECTIONS, TURBULENCE (U)

A study was conducted which encompassed a review of fundamentals and progress to date in the field of radar meteorology. The basic purpose of the study was the correlation of the findings of known authorities relative to the classification of radar reflectivity as a function of weather phenomena and the operational significance of these characteristics to aviation and air traffic control. It was concluded that the general classification of radar reflectivity as a function of weather phenomena provides a useful measure of relationship between reflectivity levels and associated degrees of turbulence. Recommendations included the continuation of Federal Aviation Agency-supported programs and the development of systems to eliminate weather clutter from displays by substitution of controlled contour outlines. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 642 716 17/2.1 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

VHF TRANSCEIVERS FOR LOW-ACTIVITY AIR TRAFFIC CONTROL TOWERS. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 66 44P Lolli,Albert V. ;
PROJ: 221-110-13X
MONITOR: FAA-RD 66-38

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSMITTER RECEIVERS, *AIR TRAFFIC CONTROL SYSTEMS), VERY HIGH FREQUENCY, COMMUNICATION AND RADIO SYSTEMS, AIRPORT CONTROL TOWERS, PERFORMANCE(ENGINEERING) (U)

Laboratory, operational, and subjective tests were performed to determine performance capability and to investigate the communications coverage area of a solid-state, low-powered (one watt) transceiver for air traffic control communications at low-activity/low-cost air traffic control facilities and as possible emergency backup equipment, with self-contained antenna, for operation within the cab of airport control towers. Results of the test effort indicated that it was feasible to use low-powered transceivers and standard FAA antennas to provide ATC communications at low-activity ATCT'S. Additionally, it was determined that adequate communications coverage, with negligible antenna pattern deterioration, was obtained when the low-powered transceiver and self-contained whip antenna were operated inside a tower cab. The report contains recommendations to develop a low-powered, portable, all solid-state transceiver, designed to operate on primary power and self-contained rechargeable batteries (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 641 698 17/7
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

NEW YORK INTERIM COMMON TRACON FACILITY SIMULATION STUDY. (U)

DESCRIPTIVE NOTE: Final rept.,
JUL 66 135P Cassell,Ricardo ;
PROJ: FAA-150-511-01V
MONITOR: SRDS RD-66-42

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, NEW YORK), AIR TRAFFIC CONTROL TERMINAL AREAS, SIMULATION, DISPLAY SYSTEMS, CONFIGURATION (U)

Simulation studies of a plan for an interim common terminal radar control facility to serve the New York metropolitan area were conducted at the National Aviation Facilities Experimental Center, Atlantic City, New Jersey. The studies were divided into two phases. In the first phase, equipment and controller arrangement configurations were explored and a single configuration was ultimately developed. In the second phase, the plan was evaluated using the configuration developed. It was concluded that the basic console design provided adequate space for all anticipated required equipments and allowed for optimum controller placement for large screen display viewing. The console design was not considered optimum for the positions located at a second row of consoles since these positions did not use the large screen displays. The equipment configuration provided an environment in which intrafacility coordination was facilitated. It was recommended that further study and evaluation of the Eidophor projection system and large screen display presentations be conducted prior to the introduction of this type of display into an operational facility. (Author) (U)

AD- 630 779 17/7 1/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J EXPERIMENTATION DIV

EXAMINATION OF SST HANDLING IN THE ATC SYSTEM, (U)

64 13P Schlots,Donald S. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the RTCA Annual Assembly Meeting 1964, Washington, D. C., 30 Sep 64.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, *SUPERSONIC AIRCRAFT), TRANSPORT AIRCRAFT, SIMULATION (U)

Activities of the Federal Aviation Agency are related that investigate the problems of air traffic control that will be evidenced by the introduction of supersonic transports. The program calls for investigative concept studies for handling Mach 3 civil transports, military aircraft, and supersonic transport planes of the Concorde family. A simulated area was set up at the Center that covered routes of 450 miles from northern Virginia to a point near Bangor, Maine. From the simulation tests, the conclusion was reached that the more preferential treatment that is given to these transports, the lower the overall airport operations rate will be; also, excessive delays will be incurred by subsonic aircraft, both en route and on the ground. (U)

AD- 623 824 17/7 9/2
UNIVAC DIV SPERRY RAND CORP ST PAUL MINN

PROGRAMMING, INTEGRATION, AND CHECKOUT OF THE STORED PROGRAM ALPHA-NUMERIC BEACON SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.
JUN 65 90P
REPT. NO. PX-3539
CONTRACT: FA64WA-5020
PROJ: 105-200D
MONITOR: SRDS , RD-65-79

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*COMPUTER PROGRAMMING, AIR TRAFFIC), (*RADAR BEACONS, AIR TRAFFIC CONTROL), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), DISPLAY SYSTEMS, CHECKOUT PROCEDURES, OPERATIONS, DIGITAL SYSTEMS, VIDEO INTEGRATION (U)

The Stored Program Alpna-Numeric Beacon System provides enroute area controllers with bright display of symbolic and alpha-numeric data relative to controller initiated tracks and automatically maintains continuous association between this data and beacon video by means of digital tracking techniques. The system consists of a digital computational subsystem, three beacon subsystems, and a display subsystem. Work performed under this contract includes design and preparation of the computer program for the operational system, electrical and operational integration of the system at the Air Route Traffic-Control Center at Indianapolis, Indiana, and checkout of the system to verify its compliance to government specifications and requirements. All system equipments, the system site, and site furnishings were provided by the government. The major functional elements of the operational computer program are tracking, processing of controller inserted data and requests, and preparation of properly formatted messages for display. The tracking function is multistate alpha, beta, straight line tracking.

(U)

AD- 623 821 17/7 12/2
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J RESEARCH DIV

AIR TRAFFIC SURVEILLANCE SATELLITES, A MATHEMATICAL MODEL FOR ACCURACY AND COVERAGE. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 65 67P Kulik,John J. ;
REPT. NO. RD-65-38

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RECONNAISSANCE SATELLITES), (*RECONNAISSANCE SATELLITES, NAVIGATION), (*MATHEMATICAL MODELS, POSITION FINDING), EFFECTIVENESS, PROBABILITY (U)

The theoretical accuracy and coverage of the two most promising air traffic surveillance satellite techniques--a two-satellite multi-rho technique and a single satellite rho-theta-theta technique--are determined by the application of a mathematical model used to derive error isograms for several combinations of satellite positions and range and angle measurement error assumptions. The complete derivation and discussion of the model employed is included, since the model is sufficiently general to apply to a great number of situations involving position determination other than air traffic surveillance. Some conclusions as to the relative merits of the two techniques studied are given, and recommendations are made for future activity. (Author) (U)

AD- 623 306
BOLLAY (E) ASSOCIATES INC GOLETA CALIF

ATC WEATHER PRESENTATION STUDIES FOR THE NATIONAL AIRSPACE SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 65 151P Goodale,D. ;Pearson,G. ;
CONTRACT: FAWA4403
PROJ: 131 311 05A
TASK: 4-12
MONITOR: SRDS , RD-65-15

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*ALL WEATHER AVIATION, AIR TRAFFIC CONTROL TERMINAL AREAS), (*AIR TRAFFIC CONTROL TERMINAL AREAS, WEATHER COMMUNICATIONS), (*WEATHER COMMUNICATIONS, AIR TRAFFIC CONTROL TERMINAL AREAS), METEOROLOGICAL PHENOMENA, DISPLAY SYSTEMS, AIRPORT CONTROL TOWERS, AVIATION SAFETY, AERONAUTICS (U)

Detailed studies were made of the ATC controllers' weather information requirements in the ARTC Center, A/D Facility, and Tower Cab. The results have been tabulated in terms of the weather parameter, display format, and updating required for each control function in each facility. A system concept has been developed to optimize the display of weather information to each facility. The concepts presented are designed to be consistent with the time period of the NAS Stage A, Model I. The dissemination of each individual weather product through the appropriate control levels of the ATC complex has been illustrated through the use of information flow diagrams which correlate display concepts with control functions. The display techniques to be used throughout the system were described as to function, formats, and the means of driving the display. These included high speed printers, strip printers, I/O typewriters, weather radar PVD displays, electromechanical indicators, alpha-numeric CRT displays, and a large screen display. (Author) (U)

AD- 623 303
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

INTERFERENCE TO AIRCRAFT CONDUCTING CATEGORY II INSTRUMENT APPROACHES BY OTHER AIRCRAFT IN VICINITY OF THE AIRPORT. (U)

DESCRIPTIVE NOTE: Technical rept.,
OCT 65 16P Proferes,Nicholas J. ;
Winich,Alexander B. ;
REPT. NO. RD-65-107
PROJ: 320 101 ^1N

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*INSTRUMENT LANDINGS, RADIO INTERFERENCE), (*AIR TRAFFIC CONTROL TERMINAL AREAS, RADIO INTERFERENCE), (*RADIO INTERFERENCE, INSTRUMENT LANDINGS), (*ALL WEATHER AVIATION, INSTRUMENT LANDINGS), NAVIGATIONAL AIDS, RADIO SIGNALS, ELECTROMAGNETIC WAVE REFLECTIONS, AIRCRAFT ANTENNAS, AIRCRAFT, TAXIING, TAKEOFF (U)

Investigations have been made with regard to possible localizer interference to aircraft conducting approaches to Category II minimums (100 feet ceiling - 1/4 mile visibility) by aircraft operating on or about the airport, taking off over the localizer, and aircraft overflying the instrument landing system localizer. (Author) (U)

AD- 622 865
SPERRY RAND CORP ST PAUL MINN UNIVAC DEFENSE SYSTEMS DIV

PROGRAMING, INTEGRATION AND CHECKOUT OF THE ADVANCED RADAR TRAFFIC CONTROL SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.
APR 65 116P
REPT. NO. PX-3489
CONTRACT: FA WA4710
PROJ: 105 200D
MONITOR: SRDS , RD-65-48

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR EQUIPMENT), RADAR TRACKING, TRACKING, TRACK WHILE SCAN, DIGITAL SYSTEMS, RADAR BEACONS, DISPLAY SYSTEMS, DATA PROCESSING, DIGITAL COMPUTERS, COMPUTER PROGRAMMING, AUTOMATION, TESTS, CORRELATION TECHNIQUES, CHECKOUT PROCEDURES, STORAGE TUBES, VIDEO SIGNALS, MAGNETIC CORES, MEMORY DEVICES, GEORGIA (U)

The Advanced Radar Traffic Control System, installed in the airport terminal building in Atlanta, Georgia, provides terminal area controllers with bright display of symbolic and alphanumeric data relative to controller initiated tracks and automatically maintains continuous association between this data and beacon and radar video by means of digital tracking techniques. The system consists of a digital computational subsystem, a beacon subsystem, and two display subsystems. The major functional elements of the operational computer program are tracking, processing of controller inserted data and requests, and preparation of property formatted messages for display. The tracking function is a multi-state alpha, beta, straight-line tracking with logical turn detection. The availability of the system's general purpose digital computers made possible an approach to equipment system integration which was primarily based upon a sequence of specially designed programed tests. System checkout was achieved through execution of a sequence of tests designed to methodically verify prescribed system operation. (U)

AD- 622 864
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

BEACON VIDEO DEFRUITING EQUIPMENT. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 65 27P Holcombe,P. G. ;
CONTRACT: FA WA4624
PROJ: AIL 8806 ,SRDS 242 001 03
MONITOR: SRDS , RD-65-87

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*INTERFERENCE ANALYZERS, RADAR BEACONS), (*RADAR BEACONS, AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR INTERFERENCE), BACKGROUND, RADAR SIGNALS, SUPPRESSORS, CORRELATORS, STORAGE TUBES, VIDEO SIGNALS (U)

The Beacon Video Defruiting Equipment is, in essence, a synchronous detector, which is constructed of transistor circuitry and storage tubes. The purpose of the equipment is to remove nonsynchronous signals from the beacon video replies in the Air Traffic Control Radar Beacon System. During operation, complete independence of the radar PRF and the beacon mode interlace ratios is maintained. (Author) (U)

AD- 622 862
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF AIRPORT LIGHTING CONTROL PANEL. (U)

DESCRIPTIVE NOTE: Final rept.,
AUG 65 38P Ritter,Morris ;
PROJ: 450 503 03V
MONITOR: SRDS , RD-65-100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, LANDING AIDS), (*CONTROL PANELS, LANDING AIDS), (*LANDING AIDS, CONTROL PANELS), COMMAND AND CONTROL SYSTEMS, LIGHTING EQUIPMENT, AIRPORT CONTROL TOWERS, MARKER LIGHTS, RUNWAYS, TESTS (U)

The Airport Lighting Control Panel consisting of the Approach Lighting System (ALS) and Visual Approach Slope Indicating System (VASI) remote control units was evaluated. The purpose of the project was to determine the operational suitability of the panel for use in the new tower cab configuration. It was concluded that the basic panel consisting of the ALS and VASI remote control units would be operationally suitable for use as an Agency standard provided modifications in the following areas were incorporated: (1) Color, contrast, size and type of backlighted pushbuttons; (2) audio alarm system, and (3) labeling (panel and backlighted pushbuttons). It was further concluded that an interface problem exists between the new ALS panel and field configurations other than the one defined in this report and that an investigation of this area must be accomplished prior to adoption of the ALS remote unit as an Agency standard. It was recommended that the basic panel consisting of the ALS and VASI remote control units be adopted for use in the newly designed FAA tower cabs after the modifications and investigations indicated have been performed. HOwever, inasmuch as no long term reliability data were recorded during this evaluation,

(U)

AD- 620 722
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROBLEMS IN AIR TRAFFIC MANAGEMENT: V. IDENTIFICATION AND POTENTIAL OF APTITUDE TEST MEASURES FOR SELECTION OF TOWER AIR TRAFFIC CONTROLLER TRAINEES, (U)

JUL 65 11P Cobb,Bart B. ;
MONITOR: FAA-AM 65-19

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Aerospace Medicine v35 n11 p1020-7 Nov 1964 (Copies not available to DDC or Clearinghouse customers). Available from CFSTI as PB-168 331, HC$1.00, MF$0.50.
DESCRIPTORS: (*AIR TRAFFIC, MANAGEMENT PLANNING AND CONTROL), (*AIR TRAFFIC CONTROLLERS, SELECTION), TRAINING, EFFECTIVENESS, APTITUDE TESTS, REASONING, WORD ASSOCIATION, PERSONALITY, STUDENTS (U)
IDENTIFIERS: ARITHMETIC (U)

A study of over 200 Terminal Air Traffic Control Specialists indicated that their training performance could be well predicted by a composite of four aptitude tests measuring: numerical ability, non-verbal abstract reasoning, ability to solve simplified air traffic problems, and verbal abstract reasoning. Pre-employment experience directly related to air traffic control was also found to contribute to the prediction of training performance. Although the aptitude tests were related in the expected direction with a measure of job performance, the relationships were small. The aptitude of verbal abstract reasoning is both unique and important for the prediction of Terminal ATCS performance. Previous research has failed to identify such an aptitude as being of importance for the prediction of Enroute ATCS performance. With the exception of verbal abstract reasoning, the group of Civil Service Commission tests presently being used to select all ATCS trainees provides adequate measures of those aptitudes which this study identified as most significant for the prediction of Terminal performance and is still appropriate for selection of Terminal and Enroute ATCS trainees. (Author) (U)

AD- 620 721
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROBLEMS IN AIR TRAFFIC MANAGEMENT: VI. INTERACTION OF TRAINING-ENTRY AGE WITH INTELLECTUAL AND PERSONALITY CHARACTERISTICS OF AIR TRAFFIC CONTROL SPECIALISTS, (U)

JUL 65 14P Trites,David K. ;
MONITOR: FAA-AM 65-21

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Aerospace Medicine v35 n12 p1184-94 Dec 1964 (Copies not available to DDC or Clearinghouse customers). Available from CFSTI as PB-168 322, HC$1.00, MF$0.50.
DESCRIPTORS: (*AIR TRAFFIC, MANAGEMENT PLANNING AND CONTROL), (*AIR TRAFFIC CONTROLLERS, PSYCHOLOGICAL TESTS), AGING(PHYSIOLOGY), APTITUDE TESTS, PERSONALITY, STUDENTS, EDUCATION, INTELLIGENCE TESTS, MEMORY(PSYCHOLOGY), PERFORMANCE(HUMAN), WORD ASSOCIATION (U)
IDENTIFIERS: ARITHMETIC (U)

Over 900 Enroute and Terminal Air Traffic Controller Specialist (ATCS) trainees were administered a large number of aptitude and personality tests. Examination of the relationships between the performance scores and age at entry into training revealed that: (1) older trainees had lower test scores than the younger trainees on tests of immediate memory and nonverbal abstract reasoning; (2) older trainees had higher test scores than younger trainees on tests of arithmetic and verbal ability; (3) in highly speeded aptitude tests, the type of test (e.g., arithmetic, spatial, vocabulary, etc.) apparently determined whether the older or younger trainees would have the higher scores; and (4) in the personality area, older trainees were more intellectually efficient, responsible, tolerant, etc., than their younger classmates. It was concluded that the higher failure rate in the training of older individuals could be partially accounted for by age-related deficiencies in non-verbal abstract reasoning, by immediate memory for new and different material, and by the requirements to perform their job tasks rapidly and accurately. (U)

AD- 620 356
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

RADIO-INTERFERENCE PROBABILITY AND ITS EFFECT ON SITE-SEPARATION STANDARDS AND FREQUENCY ASSIGNMENT OF VHF AND UHF CHANNELS. (U)

DESCRIPTIVE NOTE: Technical rept.,
AUG 65 51P Hoehn,Alfred J. ;
REPT. NO. SRDS-RD-65-91

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*RADIO INTERFERENCE, PROBABILITY), (*AIR TRAFFIC CONTROL SYSTEMS, RADIO INTERFERENCE), STANDARDS, VERY HIGH FREQUENCY, ULTRAHIGH FREQUENCY, WAVE PROPAGATION (U)

In this report equations are developed which permit computation of the probability that radio interference will occur in ATC communications. It is shown that the probability of simultaneous occurrence of desired and undesired transmissions (utilization probability) is a dominant factor affecting the presence or absence of interference. Utilization probability, in turn, is a function of the duration of ground-based and airborne emissions. Transmitter site separation is now the primary consideration for interference control although utilization and other factors are considered informally. Site separation is shown to provide little air-to-air protection under the derogated standards which must exist in congested areas. The fact that communications have not been seriously affected under these conditions is attributed to the existence of a low utilization probability, for which rough estimates are given. Site separation computations are based on worst-case situations which have a very low probability of occurrence. These separations must be violated in practice. Insufficient statistical information is available concerning the present status or projected failure point of the system. (U)

AD- 619 707
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF PLANS FOR THE CONTROL OF AIR TRAFFIC IN THE GREATER KANSAS CITY TERMINAL AREA. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 65 40P Wright,Enoch H. ;
PROJ: 150 510 01V
MONITOR: FAA , RD-65-47

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC, KANSAS), (*AIR TRAFFIC CONTROL TERMINAL AREAS, KANSAS), (*MANAGEMENT PLANNING AND CONTROL, AIR TRAFFIC CONTROL SYSTEMS), TESTS, OPERATIONS RESEARCH, SIMULATION (U)

Plans for the control of air traffic in the Greater Kansas City Terminal Area were evaluated to determine optimum control procedures, traffic flow patterns and equipment configurations. The dynamic air traffic control simulation facilities at the National Aviation Facilities Experimental Center were used in conducting the evaluation. The Federal Aviation Agency Central Region concept combined the control of instrument flight rule traffic operating at Kansas City Municipal, Mid-Continent International, RichardsGebaur AFB, Olathe NAS, Sherman AAF and St. Joseph Airports at the Kansas City Terminal Radar Approach Control Facility. In addition the concept required that both Kansas City Municipal Airport and the Mid-Continent International Airport be considered as a primary terminal. The evaluation was conducted accordingly. It was concluded that the control procedures, traffic flow patterns, and equipment configurations contained in the final plan were optimum. It was recommended that the final plan be considered for implementation. (Author) (U)

AD- 619 510
SPERRY RAND CORP CLEARWATER FLA SPERRY MICROWAVE ELECTRONICS DIV

DEVELOPMENTAL ATC RADAR BEACON SYSTEM GROUND STATION PERFORMANCE MONITOR. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 64 73P Pate,George W. ;funke,W. G. ;
CONTRACT: FAA/ARDS-456
PROJ: 108 12
MONITOR: SRDS , RD-64-152

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), (*RADAR BEACONS, AIR TRAFFIC CONTROL SYSTEMS), (*MONITORS, AIR TRAFFIC CONTROL SYSTEMS), ELECTRONIC EQUIPMENT, FAILURE, TEST EQUIPMENT, AVIATION SAFETY, RADIO NAVIGATION, SPECIFICATIONS (U)

The ATC Radar Beacon System Ground Station Performance Monitor is designed to provide alarm indications to maintenance and operating personnel should any of the various system parameters deviate beyond acceptable operational limits. In addition, the monitor provides a confidence check on the operation of the ground station decoder and azimuth presentation accuracy by providing a simulated reply code train through a test antenna located at a known azimuth position. The decoded simulated reply is observed on the operators PPI as a direct confidence check. The monitor is a dual monitor providing two complete monitor channels. Logic and switching circuitry is provided which may be utilized to switch monitors in the event of an alarm; automatically switch systems between the active ATC transmitterreceiver and the standby transmitter-receiver in the event of an alarm in the active system or automatically take control of the standby system for periodic monitoring, etc. This report summarizes program activity through the acceptance test phase at the National Aviation Facilities Experimental Center.

(U)

AD- 619 445
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

STATISTICAL ANALYSIS OF AIRCRAFT DELAY. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 65 35P Wisepart,I. S. ;Warskow,M. A. ;
REPT. NO. AIL-1400-6
CONTRACT: FAA BRD403

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*STATISTICAL ANALYSIS, AIR TRAFFIC), (*AIR TRAFFIC, TIME STUDIES), CIVIL AVIATION, AIR TRAFFIC CONTROLLERS, SAMPLING, SCHEDULING (U)

The purpose of this work is to analyze the delay to samples of various segments of the aircraft population (air carrier, general aviation, military, and one airline) and to determine the extent to which the amounts of delay are typical of the average delay of total traffic. Information obtained in previous AIL work for the FAA and others was used as the basis for this study. The data were selected from days during the years from 1961 to 1964; the delays to aircraft operating during the busiest hours of those days were analyzed. Aircraft that experienced no delays during these hours were included in the sample. Sample sizes for each case analyzed were as high as 361. There was a total of 33 cases in addition to three composites. The total number of samples was 5054. A computer performed the statistical analysis of the data from six major airports in the United States. For each of the total-traffic samples, 95-percent confidence intervals were computed and the average delays of each segment were tested to determine whether they were within the confidence intervals. Based on the six airports studied, it is generally believed that at the major air-carrier airports air-carrier delay is a good representative of total-traffic delay. However, the delays experienced by general aviation and a single airline (United Airlines was selected) were found to be significantly different from the total-traffic delays. It was also found that United Airlines delays for the cases studied were not typical of total air-carrier delays. (Author) (U)

AD- 618 679
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF ATCBI DECODER MODIFICATIONS. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 65 57P Waldmann,Robert A. ;
PROJ: 242 005 02V
MONITOR: FAA , RD-65-59

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*RADAR BEACONS, AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), GROUND SUPPORT EQUIPMENT, RADAR EQUIPMENT, TRANSPONDERS, DECODING, SPECIFICATIONS, NAVIGATIONAL AIDS (U)

A set of prototype modifications to the decoders of Air Traffic Control Radar Beacon Ground Station, Types ATCBI-2 and ATCBI-3, were evaluated to ensure validity of the design of the modifications as a basis for a product specification. The modifications were designed primarily to detect and process emergency (code 7700) replies, communication-failure (code 7600) replies, and four-train (military) emergency replies. Performance of the modified decoders was observed in order to support estimates of the ability to decode properly a valid emergency reply, communication-failure reply, or four-train emergency reply, occurring in a live operational environment. False alarm rates were investigated under various operating conditions. It was concluded that the basic design of the modifications was valid and, with certain improvements could serve as the basis for a product specification. It was recommended that the basic design be adopted as the basis for the product specification and the modifications be implemented by means of field modification kits. It was also recommended that final acceptance and implementation in the field be contingent upon a practical demonstration that the alignment procedures, supplied with the production modifications, are satisfactory. (U)

AD- 618 521
SYRACUSE UNIV RESEARCH CORP N Y DEFENSE SYSTEMS DIV

ATCBI-2 LINEAR SYSTEM AND ATCBI-3 LOGARITHMIC SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 65 83P Doty,James C. ;
CONTRACT: FAA ARDS533
PROJ: 108 3 8D
MONITOR: SRDS , RD-65-28

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, TRANSPONDERS), (*RADIO BEACONS, TRANSPONDERS), (*LOGARITHMIC AMPLIFIERS, INTERMEDIATE FREQUENCY AMPLIFIERS), LINEAR SYSTEMS, NONLINEAR SYSTEMS, BEACONS, AZIMUTH (U)

Two methods of providing precision azimuth centermarks were built for use in the Federal Aviation Agency Beacon Navigation system. These methods utilize an amplitude monopulse beacon receiver. The receiver antenna pattern is split into sum and difference channels. The sum channnel produces a conventional maximum output with a target on boresight, while the difference channel output nulls when a target is on boresight. By comparing the relative signal strength of the sum and difference channels, the target azimuth can be determined to less than a quarter of a degree. Such an equipment must be capable of operating over an extremely wide range of signal strengths. In the ATCBI-2 linear equipment the sum and difference signals are amplified in linear IF amplifiers. The problem of varying signal strengths is solved by controlling the gain of the IF amplifiers with a sensitivity time control (STC). The second method described is the ATCBI-3 logarithmic equipment. This approach to the problem of varying signal strengths was developed later and seems more satisfactory than the STC approach. (Author) (U)

AD- 618 394
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J EXPERIMENTATION DIV

AIR TRAFFIC CONTROL RADAR BEACON SYSTEM 3-PULSE SIDE LOBE SUPPRESSION EXPERIMENTATION. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 64 82P Spingler,George F. ;
PROJ: 108 3X
MONITOR: FAA RD-64-36

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), (*RADAR BEACONS, ANTENNA RADIATION PATTERNS), OMNIDIRECTIONAL ANTENNAS, SEMICONDUCTOR DIODES, MICROWAVE EQUIPMENT, ANTENNA LOBES, SIDE-LOOKING ANTENNAS, RADAR PULSES, RADAR ANTENNAS, ELECTRONIC SWITCHES, COMPATIBILITY, TESTS (U)
IDENTIFIERS: SIDE LOBE SUPPRESSION (M)

The report contains the results of technical and operational tests of Air Traffic Control Radar Beacon System 3-Pulse Side Lobe Suppression Development equipment to determine their suitability for implementation of the 3-Pulse Side Lobe Suppression technique. The Side Lobe Suppression Omni-directional Antenna met the side lobe coverage and netting with the Directional Antenna requirements. The colocation siting problems of the Omnidirectional and the Directional Antennas were also investigated and found to be minor in nature. A number of difficulties requiring modification of the ATCBI-2 Transmitter System were uncovered during the experimental testing of the 3-Pulse Modification Kit, but the 3-Pulse Modification Kit did effectively perform the basic requirement of generating the correct number of mode and side lobe suppression pulses. The original Side Lobe Suppression Crystal Diode Switch failed to meet the insertion loss specification, but with the modification of the switch crystals, all specifications were met. The various modifications to incorporate the 3-Pulse Side Lobe Suppression technique were feasible and compatible; . (U)

AD- 618 029
BURROUGHS CORP PAOLI PA

RADAR VIDEO DATA PROCESSOR. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 64 172P Pasquine,P. ;
CONTRACT: FA WA4693
PROJ: 231 001 01C
MONITOR: SRDS , RD-64-128

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DATA PROCESSING), (*DATA PROCESSING, AIR TRAFFIC CONTROL SYSTEMS), (*TARGET RECOGNITION, AIR TRAFFIC CONTROL SYSTEMS), DISPLAY SYSTEMS, RADAR RANGE COMPUTERS, RADAR CLUTTER, SEARCH RADAR, RADAR INTERFERENCE, RADAR BEACONS, AIRPORT RADAR SYSTEMS, COMPUTERS, POSITION FINDING, TESTS (U)

The report covers the design, fabrication, and acceptance testing of four solid-state Radar Video Data Processors (RVDP) intended for use as engineering models in the NAS Air Traffic Control Program. The RVDP accepts search radar video (Normal and MTI), antenna synchro voltages, and triggers from Airport Surveillance (ASR) or Air Route Surveillance (ARSR) radars; also accepted are beacon replies from ATCBI equipment. The function of the RVDP is to process these search and beacon inputs and furnish target messages to a Central Computer Complex (CCC). The RVDP detects targets statistically, determines target position to an accuracy of 1/16 NM in range and 0.088 degrees in azimuth, resolves targets which are at the same azimuth but separated in slant range by 1/4 NM (for ARSR) or 1/8 NM (for ASR), and resolves targets which are at the same range but separated in azimuth by 1.5 antenna beamwidths. Radar targets are detected by an advanced, double-threshold method which minimizes the quantizing of noise as target hits and reduces the number of false alarms due to clutter. A salient RVDP feature is the automatic clutter eliminator (ACE), which assures a high probability of detecting primary radar targets otherwise obscured by thermal noise or clutter. (U)

AD- 616 902
FEDERAL AVIATION AGENCY WASHINGTON D C

A REPORT ON THE DETERMINATION OF ENGINEERED STAFFING STANDARDS FOR MAINTENANCE OF INSTRUMENT LANDING SYSTEMS AND THE DEVELOPMENT OF A METHODOLOGY FOR DETERMINING ENGINEERED STAFFING STANDARDS FOR MAINTENANCE OF ALL AIR TRAFFIC CONTROL, AIR NAVIGATION, AND COMMUNICATION FACILITIES. (U)

DEC 64 226P Lichtenberg,Warren ;Minchow, Hubert ;Levey,Fred ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*PERSONNEL MANAGEMENT, STANDARDS), (*INSTRUMENT LANDINGS, SYSTEMS ENGINEERING), (*AIR TRAFFIC CONTROL SYSTEMS, MAINTENANCE), (*NAVIGATION, SYSTEMS ENGINEERING), (*COMMUNICATION SYSTEMS, SYSTEMS ENGINEERING), ANALYSIS, PERSONNEL, MANAGEMENT ENGINEERING, LABOR (U)

Engineered work element and staffing standards for maintenance of instrument landing systems are presented along with an analysis of the techniques used in their development. The approach taken in developing the standards and an analysis of the data gathered during the study are discussed. Work element standards are designed in such a manner that a bottom-up summation of the standards will provide useful input to the decision-making process. A methodology is offered for use in developing engineered standards for all facilities within the purview of the Systems Maintenance Service and for determining optimum maintenance policy. (Author) (U)

AD- 615 952
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF PLAN FOR CENTRAL APPROACH CONTROL FACILITY AT JACKSONVILLE. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 65 53P Rossiter,S. B. ;
PROJ: 150 519 01V
MONITOR: SRDS , RD-65-43

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*APPROACH, AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, APPROACH), LANDING FIELDS, RUNWAYS, FLORIDA, SIMULATORS, FEASIBILITY STUDIES (U)

An evaluation of a proposed plan for consolidating the functions of three separate approach control facilities in the Jacksonville, Florida terminal area into one Central Approach Control Facility was conducted using the Model B Dynamic Air Traffic Control Simulator at the National Aviation Facilities Experimental Center, Atlantic City, New Jersey. The plan was tested, using two different runway configurations, for the purpose of optimizing the plan and determining its feasibility for handling the peak hour volume of traffic generated by Imeson, Navy Jacksonville and Navy Cecil Airports. The report contains a documentation of the optimized plan indicating terminal flow patterns, control procedures, airspace utilization and equipment configuration. It was concluded that the plan was feasible for handling the specified peak hour traffic and it was recommended that consideration be given to using these procedures for the proposed Jacksonville Central Approach Control Facility. (Author) (U)

AD- 615 818
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

HEIGHT CODE TABLES FOR USE WITH AIR TRAFFIC CONTROL RADAR BEACON SYSTEM, (U)

MAY 62 42P
REPT. NO. 8893-SP-1
CONTRACT: FAA/BRD329
TASK: 6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, HEIGHT FINDING), (*HEIGHT FINDING, AIR TRAFFIC CONTROL SYSTEMS), (*RADAR BEACONS, AIR TRAFFIC CONTROL SYSTEMS), DATA TRANSMISSION SYSTEMS, ELECTROMAGNETIC PULSES, DIGITAL SYSTEMS, TABLES(DATA) (U)

The Seventh Communications Division of the International Civil Aviation Organization (ICAO) has recommended the adoption of a digital code for automatic height transmission via the AIR TRAFFIC CONTROL RADAR BEACON SYSTEM. Salient features of the code are (1) One-hundredfoot digitizing increments; (2) Range from -1000 feet to +126,750 feet; (3) Compatibility with limited-capability 500-foot incremented code; (4) Unambiguous unit-distance characteristic; (5) Height transmission with respect to a fixed datum of 1013.2 millibars (29.92 inches of mercury). The code, as recommended by ICAO, is tabulated for height increments in increasing numeric order and for the equivalent octal Mode 3/A reply in increasing numeric order. The PULSE POSITIONS column lists the timesequence assignment of the pulse-transmission reply, and the HEIGHT CODE POSITIONS column gives a rearrangement of the code information in significant-digit sequence. Five-hundred-foot increments are extracted from the tables by omitting the C information pulses for the appropriate integer multiple of 500-foot height. (Author) (U)

AD- 615 266
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J EXPERIMENTATION DIV

IMPROVED EQUIPMENT ARRANGEMENTS FOR ARTC CENTERS. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 65 97P Scott,George A. ;Bradbury,P. W. ;Eichenlaub,J. H. ;Mitchell,R. H. ;
PROJ: 150 523 01X
MONITOR: SRDS , RD-65-27

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OPERATIONS RESEARCH), EXPERIMENTAL DATA, CONFIGURATION, SYSTEMS ENGINEERING (U)

This report describes the continued experimental development and testing effort directed toward in-service improvements to existing Air Route Traffic Control operational equipments. Through the use of an environmental laboratory, the In-line, Peninsula and Island console designs were established, modified and appraised. Field controller opinion and recommendations were used as a basis for determining the advantages or disadvantages of particular equipments and their locations, console modifications and configurations. The report recommends the most favorable placement of operational equipments and controls, as well as substantial improvements in sector lighting, information displays and hardware modification. (Author) (U)

AD- 614 841
MAXSON ELECTRONICS CORP GREAT RIVER N Y

25 KW TACAN TRANSMITTER ASSEMBLY. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 65 53P Rosen,Arnold ;
CONTRACT: FAA/ARDS-630
PROJ: 115 47D
MONITOR: SRDS , RD-64-151

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*RADIO NAVIGATION, RADIO TRANSMITTERS), (*RADIO TRANSMITTERS, RADIO NAVIGATION), (*AIR TRAFFIC CONTROL SYSTEMS, RADIO NAVIGATION), RADIO BEACONS, GROUND SUPPORT EQUIPMENT, TETRODES, RADIOFREQUENCY AMPLIFIERS, FEEDBACK, CIRCUITS, WIRING DIAGRAMS (U)
IDENTIFIERS: TACAN (U)

TACAN is an aircraft-to-ground beacon navigation system which provides to aircraft, over large areas, the azimuth angle and the range of the aircraft to the ground beacon. This report describes the work that was accomplished towards the development of a 25-kilowatt peak power TACAN transmitter ground beacon using negative grid tubes. A technique for obtaining a desired output spectrum from an RF amplifier by making an envelope comparison with a stable reference was postulated. The use of this technique would allow a TACAN Transmitter to be constructed without the spectrum control filter that is currently used. This program has shown it is possible to control a transmitter spectrum by the use of this feedback technique. The test results obtained at 22 kw were sideband ratios of 48 to 49 db. Subsequent to the suspension of this program additional tests were performed at a 13-kw level. The amplifier was constructed of a chain of ceramic coaxial tetrodes. The tubes are capable of delivering the desired output power of 25 kilowatts. Operating with low, fixed plate and screen voltages results in a very small pulse modulator and a reduction in d-c power requirements. A broadband frequency multiplier was developed which simplifies tuning procedures in changing the transmitter from one operating channel to another. (U)

AD- 613 477
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J EXPERIMENTATION DIV

UAL/FAA ATC RADAR BEACON ALTITUDE REPORTING TEST. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 65 39P Hierbaum,Felix F. ,Jr.;
Yulo,Carlo ;
PROJ: 242 006 03X
MONITOR: SRDS , RD-65-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*RADAR BEACONS, HEIGHT FINDING), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR BEACONS), AUTOMATIC, DATA TRANSMISSION SYSTEMS, EFFECTIVENESS, TESTS, ALTIMETERS, DISPLAY SYSTEMS, TRANSPONDERS, RADAR EQUIPMENT, AIRBORNE, CIVIL AVIATION (U)

The National Aviation Facilities Experimental Center monitored 186 flights of 25 different United Air Lines Boeing 727 aircraft and 17 flights of three different Douglas DC-8F aircraft, all equipped with Air Traffic Control Radar Beacon System (ATCRBS) automatic altitude reporting capability. The participating aircraft were equipped with two different types of automatic altitude reporting configurations, and two different types of ground decoding and display systems were used. Information was gathered on adequacy of the ATCRBS pressure altitude transmission medium, the technical integrity of the two specific decoding and display systems, and correspondence between the pilot altitude display in the cockpit and the radar beacon altitude display at the ground facility. The data analyzed and controller comments on data received are included along with review notes. (Author) (U)

AD- 612 898
TRW COMPUTERS CO CANOGA PARK CALIF

AIR TRAFFIC CONTROL STUDIES. TERMINAL AREA SEQUENCING AND CONTROL. (U)

DESCRIPTIVE NOTE: Rept. no. 10 (final) 1 Jan 60-28 Feb 61,
FEB 61 253P Jackson,A. S. ;Ottoson,H. I. ; Pardee,R. S. ;Nall,L. E. ;Holland,F. C. ;
CONTRACT: FAA BRD112

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Rept. on project TASC.
DESCRIPTORS: (*AIR TRAFFIC CONTROL TERMINAL AREAS, SIMULATION), REAL TIME, FLIGHT SIMULATORS, COMPUTERS, DISPLAY SYSTEMS, APPROACH, LANDING, CONTROL SEQUENCES, HUMAN FACTORS ENGINEERING, SYSTEMS ENGINEERING, ALL WEATHER AVIATION, AVIATION SAFETY (U)

The major areas of coverage are: (1) philosophy and aims of real-time simulation in the terminal area, (2) equipment available for real-time simulation, (3) brief description of the systems that have been simulated, and (4) results obtained from real-time simulation and theoretical studies. (U)

AD- 612 882
FEDERAL AVIATION ADMINISTRATION WASHINGTON D C SYSTEMS RESEARCH AND DEVELOPMENT SERVICE

REMOTE CONTROL AIR GROUND FACILITY MONITORING. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 65 22P Barkalow,Raymond R. ;
REPT. NO. RD-65-19
PROJ: 113 005

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, REMOTE CONTROL), (*COMMUNICATION EQUIPMENT, MONITORS), VOICE COMMUNICATIONS, VERY HIGH FREQUENCY, ULTRAHIGH FREQUENCY, TELEPHONE LINES (U)

The requirements of a fully effective RCAG monitor are discussed and a description of a Systems Research and Development Service developed monitor meeting these requirements is described. Also described is a simple line monitor which is being provided by the American Telephone and Telegraph Company. A cost benefit analysis shows that over 75% of the total RCAG outages is attributable to the line and that monitoring only the lines will result in a savings of approximately $61,000 annually in travel expenses. The analysis also shows that no savings can be effected by monitoring equipment at the RCAG and that to provide an effective RCAG monitor for operational purposes would be economically prohibitive. (Author) (U)

AD- 612 362
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

USE OF SELF-CONTAINED NAVIGATION AIDS IN DOMESTIC AIRSPACE. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 64 123P Hooton,E. N. ;Wisepart,I. S. ;Abramson,P. ;
REPT. NO. AIL-3523-1
CONTRACT: FA WA4680
PROJ: 115 17R
MONITOR: SRDS . RD-64-131

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*NAVIGATIONAL AIDS, CIVIL AVIATION), (*AIR TRAFFIC CONTROL SYSTEMS, NAVIGATIONAL AIDS), (*DOPPLER NAVIGATION, CIVIL AVIATION), (*INERTIAL NAVIGATION, CIVIL AVIATION), FLIGHT PATHS, ALL WEATHER AVIATION, GROUND SUPPORT EQUIPMENT (U)

This report contains an introduction to general navigational principles as applied to the use of doppler and inertial systems. This is followed by a description of both systems concerning methods of operation (such as steering), accuracy, etc. In-flight errors must be checked by some external ground-based navigation aids and this is discussed in some detail. A simplified procedure is given using VORTAC. After a description of airline flight planning, the impact of self-contained navigation techniques on the air-traffic-control system is discussed relative to en-route flying and the terminal area. It is concluded that doppler and inertial can be used successfully in domestic operations and that, subject to certain procedures, every encouragement should be given to all operators (including general aviation) to use doppler, and later inertial, in the domestic airspace. (Author) (U)

AD- 611 096
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB

AUTOMATIC AIR TRAFFIC CONTROL. PART I. A PROJECTED SYSTEM, (U)

NOV 62 44P Kypta,L. S. ;
REPT. NO. R-145-A
CONTRACT: DA36 039SC85122
TASK: DA-39901002

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes REpt. no. R-145 dated Aug 62, AD-286 887.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATIC), (*DECISION MAKING, AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC CONTROLLERS, DIGITAL COMPUTERS, VOICE COMMUNICATIONS, DISPLAY SYSTEMS, DATA STORAGE SYSTEMS, APPROACH, AVIATION SAFETY, FLIGHT PATHS, TRACKING, DATA PROCESSING (U)

The automatic air traffic control system described in the report consists of automatic control centers for en route control and small satellite computers for approachdeparture control. Each automatic control center is composed of 5 automatic sections providing the following functions: (1) position gathering and tracking, (2) internal communication, (3) manual input and display, (4) control, and (5) information storage. An automatic center is capable of controlling over 1000 aircraft simultaneously. Each satellite computer is intended to control approaching and departing aircraft for one airport and is capable of controlling 50 flights simultaneously. The goal in the design of the system is to provide a system that in no way hinders traffic flow and also is safe and simple to use. To achieve this goal, it is necessary to automate all processes in which information flows in large quantities or is rapidly changing. The most important process falling in this category is decision making; consequently, decision making has been automated. All processes in which information is slowly changing or infrequently exchanged are to executed manually. (Author) (U)

AD- 611 084
ARCON CORP LEXINGTON MASS

ANALYSIS OF ORGANIZED ROUTE SYSTEMS IN THE NORTH ATLANTIC. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 64 251P
CONTRACT: FA WA4620
PROJ: 116 33
MONITOR: FAA , RD-64-142

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, ATLANTIC OCEAN), (*SYSTEMS ENGINEERING, AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC, MATHEMATICAL ANALYSIS, ECONOMICS, CONTROL SIMULATORS, OPERATION, AIR TRANSPORTATION (U)

This report presents the results of a detailed examination of operational and economic consequences of adopting organized route procedures in the North Atlantic Air Traffic Control System. It is a natural extension of a previous study, System Analysis of the North Atlantic Air Traffic Complex, ARCON Corporation, R 62-3, Contract No. FAA/BRD-334, December 1962 (AD-294 610). Particular emphasis is placed on the aircraft users' requirements and their use as basic criteria in the determination of the economic implications of organized route systems. Also presented is a technique for the formulation of traffic forecasts and a discussion of their significance to the system designer. Several proposed changes and improvements in the present organized route system are analyzed in terms of their operational and economic significance. Detailed mathematical treatments and descriptions of digital computer simulations used in the evaluation of system performance are given in the Appendices. These are: A. Analysis of Organized Route Geometry, B. Air Traffic Control Model, and C. Flight Time Penalty Evaluation. (Author) (U)

AD- 610 779
TRANSCO PRODUCTS INC VENICE CALIF

SMALL, LIGHTWEIGHT ALTITUDE TRANSMISSION EQUIPMENT (SLATE). (U)

DESCRIPTIVE NOTE: Final rept.
JUL 64 54P
CONTRACT: FAA/ARDS-476
PROJ: 242 006 01
MONITOR: FAA , RD64 110

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-404 560.
DESCRIPTORS: (*TRANSPONDERS, AIR TRAFFIC CONTROL SYSTEMS), (*HEIGHT FINDING, TELEMETER SYSTEMS), (*TELEMETER SYSTEMS, HEIGHT FINDING), (*AIR TRAFFIC CONTROL SYSTEMS, TRANSPONDERS), RADIO EQUIPMENT, AIRCRAFT EQUIPMENT, ALTIMETERS, DATA TRANSMISSION SYSTEMS, SPECIFICATIONS, COSTS, AIRBORNE, FEASIBILITY STUDIES (U)
IDENTIFIERS: SLATE II, SLATE I (U)

This report describes the development of experimental SLATE Transponders, airborne equipment designed primarily for use by General Aviation Aircraft in the Air Traffic Control Radar Beacon (ATCRBS) environment. Four types of transponders were developed, each containing progressive increases in sophistication so that the effectiveness of each type in air traffic control could be separately evaluated. The Type I reported altitude only (Mode C) in 500 foot increments to 14,500 ft. MSL with a single SPI pulse for identification purposes. The Type II had the added capability of 64 codes on Mode 3/A, with the SPI pulse changed over to Mode 3/A from Mode C. The Type III transponder contained 64 codes and SPI on Mode 3/A, but changed the altitude increments from 500 feet to 100 feet. The Mark I version of the SLATE III increased the code content on Mode 3/A from 64 to 4096. During the development program, several basic designs of transponder circuitry were investigated in an attempt to reduce size, weight, power consumption and cost. This included a magnetic recording encoder/decoder, TRF receiver, digital clock-matrix encoder and various transmitter, (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 610 312
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

ORTHOGRAPHIC REPRESENTATIONS OF THE ENGLISH PRONUNCIATION AS AN AID IN TEACHING ILA. SUPPLEMENT NO. 1, (U)

59 16P Moser,Henry M. ;Oyer,Herbert J. ;Fotheringham,Wallace C. ;
CONTRACT: AF19 604 4575
MONITOR: AFCRC , TN59 75 Suppl. 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*SPEECH REPRESENTATION, TRAINING DEVICES), (*TRAINING DEVICES, AIR TRAFFIC CONTROLLERS), (*AIR TRAFFIC CONTROLLERS, SPEECH), LANGUAGE, EDUCATION (U)
IDENTIFIERS: GREEK LANGUAGE, PRONUNCIATION (U)

A supplement to the report, Orthographic Representation of the English Pronunciation as an Aid in Teaching ILA, is presented (PB-150 248). To the nine languages included in the original report, the present list adds a Greek orthographic spelling of air traffic control words and phrases. This list has not as yet been subjected to the experimental evaluation performed on behalf of the original nine orthographic spellings. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 609 497
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

RADAR DATA MEASURING SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 64 80P
CONTRACT: FA WA4206
PROJ: 107 9D
MONITOR: FAA , RD64 126

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, RADAR EQUIPMENT), (*RADAR REFLECTIONS, MEASUREMENT), (*DIGITAL RECORDING SYSTEMS, RADAR REFLECTIONS), SEARCH RADAR, RADAR EQUIPMENT, RADAR SIGNALS, RECORDING SYSTEMS, RADAR TARGETS, AIRCRAFT, SIGNAL-TO-NOISE RATIO, TRACK WHILE SCAN, RADAR TRACKING, DIGITAL COMPUTERS, DATA (U)

This report describes the design, development, and field tests of the Radar Data Measuring System. This system operates in conjunction with search radars, and continuously makes and records signal energy measurements while automatically tracking a selected aircraft. The system contains three identical measuring channels that measure the ratio of total integrated signal energy to average system noise level; it also contains a fourth signal measuring channel that makes pulse-to-pulse peak amplitude measurements. The four channels operate in parallel on a single selected aircraft. It is concluded that the Radar Data Measuring System fulfils its intended use, and that the signal measurements are an accurate measure of the aircraft signal energy returns. The system has been tested on three different radars and has performed quite satisfactorily with all three. (U)

AD- 608 952
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

DYNAMIC SIMULATION STUDIES OF PICTORIAL NAVIGATION DISPLAYS AS AIDS TO AIR TRAFFIC CONTROL IN A LOW-DENSITY TERMINAL AREA AND IN AN EN ROUTE AREA. (U)

DESCRIPTIVE NOTE: Final rept.,
FEB 63 74P Sluka,A. L. ;
PROJ: FAA-115-703X

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*GROUND POSITION INDICATORS, DISPLAY SYSTEMS), (*DISPLAY SYSTEMS, FLIGHT INSTRUMENTS), (*NAVIGATIONAL AIDS, DISPLAY SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, DISPLAY SYSTEMS), DYNAMICS, SIMULATION, AIR TRAFFIC CONTROL TERMINAL AREAS, INSTRUMENT FLIGHT, NAVIGATION COMPUTERS, AIR TRAFFIC, FLIGHT PATHS, RADAR NAVIGATION, EFFECTIVENESS, SYSTEMS ENGINEERING (U)

This report describes an ATC dynamic simulation study that was conducted to determine the operational value of cockpit pictorial displays, course line computers, and pictorial computers as aids to air traffic control in a low-density terminal area and in an en route area. The Salt Lake City terminal area was used for the low-density study, while the en route structure from Miami to New York was selected as the en route area of investigation. In the en route studies, particular emphasis was placed on the route structures centered around Miami, Jacksonville, and New York. The study showed that pictorial display routes, procedures and techniques can be systematically integrated with the existing system, and generally meshed smoothly with simultaneous use of radar techniques. Improvements were related to a simplification of the control functions as indicated by reduction in controller workload and an increased ability to manipulate traffic. This modified the control function from that of radar navigation to the less demanding function of radar monitoring. (Author) (U)

AD- 608 806
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF AUTOMATIC TERMINAL INFORMATION SERVICE APPLICATIONS. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 64 66P Wright,Enoch H.;
PROJ: 150 513 02V
MONITOR: FAA RD64 135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL TERMINAL AREAS, RECORDING SYSTEMS), (*TERMINAL FLIGHT FACILITIES, EFFECTIVENESS), FEASIBILITY STUDIES, DATA TRANSMISSION SYSTEMS, VOICE COMMUNICATIONS, RADIO TRANSMISSION, AUTOMATIC (U)

The purpose of this project was to evaluate applications of Automatic Terminal Information Service at several types of terminal areas using varied procedures and radio facilities to broadcast the information. Tests using automatic recording and broadcast equipment were conducted in the Van Nuys and San Francisco/Oakland, California terminal areas and the Chicago, Illinois O'Hare Airport terminal area. The information was broadcast on the voice channels of VOR test facilities, navigational aids and a discrete frequency. Based on the results of the evaluation, it was concluded that, although interference problems may exist in some locations, the VOR test facilities, modified with a voice channel and increased output power was a satisfactory method of transmitting a combined arrival and departure Automatic Terminal Information Service message, resulting in reduced controller workload and radio frequency congestion. It was also concluded that although the use of a navigation facility voice channel was a satisfactory method of transmitting Automatic Terminal Information Service arrival messages, it precluded the use of such a facility for weather broadcast and ground/air communications at some locations. It was also concluded that the sequential transmission of Automatic Terminal Information Service (U)

AD- 608 722
FEDERAL AVIATION AGENCY WASHINGTON D C

A SYSTEM DESIGN FOR THE PROVISION OF A SAFER, MORE ECONOMIC, AND MORE EFFICIENT AIR TRAFFIC SERVICE FOR THE ICAO NORTH ATLANTIC REGION. (U)

AUG 64 95P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Rept. on Proj. SPANAT.
DESCRIPTORS: (*AVIATION SAFETY, AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, ATLANTIC OCEAN), (*ATLANTIC OCEAN, AIR TRAFFIC CONTROL SYSTEMS), SYSTEMS ENGINEERING, COMMUNICATION SYSTEMS, METEOROLOGY, NAVIAGTION, FLIGHT PATHS, POLAR REGIONS, JET AIRCRAFT, COMMERCIAL PLANES, TRANSPORT AIRCRAFT, DATA PROCESSIN(U)
IDENTIFIERS: NORTH ATLANTIC REGION, SEARCH AND RESCUE SYSTEMS (U)

The ICAO Fourth North Atlantic Regional Air Navigation Meeting adopted a recommendation which called for the introduction of a systems planning concept to the ICAO North Atlantic Region. Following acceptance of this recommendation by the ICAO Council, the Federal Aviation Agency (FAA) established a team of experts designated the 'Systems Planning Approach North Atlantic Team' (SPANAT) to undertake the development of a system design directed toward attainment of the proposed goals. Specifically, the Team was to attempt to produce a system design plan which would, for the time period encompassed, provide the most practical solutions to the major problems incident to the provision of safe, regular, and efficient air operations in the North Atlantic Region. In developing the systems design plan for the North Atlantic, the Team received invaluable assistance from other Agencies and from various components of the airline industry. The demonstration system design plan, while considered valid in terms of the present technical state-of-art and in terms of the traffic forecasts which have been developed in concert with other principal North Atlantic Provider States, is not to be construed as necessarily representing, in all of its details, firm Agency positions. (U)

AD- 608 532
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS PSYCHOLINGUISTIC LAB

THE PRONUNCIATION OF ENGLISH AIR TRAFFIC CONTROL WORDS BY CONTROLLERS FROM TWELVE ICAO NATIONS. (U)

DESCRIPTIVE NOTE: Final rept.
JUL 64 46P Moser,H. M. ;
CONTRACT: FAA/BRD-407
PROJ: FAA-113-026R
MONITOR: FAA-RD 64-123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, SPEECH REPRESENTATION), (*SPEECH REPRESENTATION, AIR TRAFFIC CONTROLLERS), SPEECH, INTELLIGIBILITY, SPEECH RECOGNITION, VOCABULARY, LANGUAGE, COMMUNICATION SYSTEMS, TRAINING DEVICES, RECORDS, AVIATION PERSONNEL, DICTIONARIES (U)
IDENTIFIERS: PRONUNCIATION, WORDS(LANGUAGE) (U)

Selected English air traffic control words and phrases were recorded as pronounced by controllers in twelve ICAO nations. These recordings were analyzed and lexicons of variant pronunciations of these words which might be encountered in various places were produced. A summary lexicon is included, as is a guide for recommended pronunication of the words. The procedures for gathering and analyzing the data and a method of pronunciation representation are also discussed. (Author) (U)

AD- 608 393
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF CLOSED-CIRCUIT TELEVISION FOR AIRPORT BLIND-SPOT SURVEILLANCE. (U)

DESCRIPTIVE NOTE: Final rept.
SEP 64 86P Moore,Leonard C. ;Delaney, Robert W. ;
PROJ: 110 301 01V
MONITOR: FAA , RD64 133

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC TERMINAL AREAS, TELEVISION SYSTEMS), (*TELEVISION SYSTEMS, AIR TRAFFIC CONTROL TERMINAL AREAS), AIRPORT CONTROL TOWERS, TELEVISION EQUIPMENT, TERMINAL FLIGHT FACILITIES, AIR TRAFFIC CONTROL SYSTEMS, PERFORMANCE (ENGINEERING), TELEVISION CAMERAS, TELEVISION DISPLAY SYSTEMS (U)

An evaluation of closed-circuit television was conducted at the Municipal Airport No. 1, Salt Lake City, Utah, to determine the operational capabilities and limitations of the system when used for the surveillance of critical portions of airport operating areas which could not be observed directly by airport traffic controllers. Meteorological conditions over a broad portion of the airport offered an extensive 'blind area' within which operating control points were treated separately as well-defined 'blind spots' of limited size. Lightweight single-engine aircraft were observed throughout the test program. The closed-circuit television system included two cameras, remotely operated from the Airport Traffic Control Tower Cab. It was concluded that closed-circuit television can provide pictorial information suitable for blind-spot surveillance of critical areas not directly visible from the Control Tower Cab of the airport. The principal operational limitations resulted from (a) the need to maintain a stationary frame of reference, both day and night, and (b) the absence of depth perception.

(U)

AD- 608 100
SPERRY RAND CORP CLEARWATER FLA SPERRY MICROWAVE ELECTRONICS DIV

ATCRBS SLS OMNI DIRECTIONAL ANTENNA PROTOTYPE MODELS I AND II. (U)

DESCRIPTIVE NOTE: Final engineering rept.,
APR 64 20P Strother,R. E. ;
CONTRACT: FA WA4656
PROJ: 108 2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OMNI DIRECTIONAL ANTENNAS), (*OMNI DIRECTIONAL ANTENNAS, AIR TRAFFIC CONTROL SYSTEMS), (*RADAR ANTENNAS, AIR TRAFFIC CONTROL SYSTEMS), ANTENNA LOBES, RADAR BEACONS, DESIGN, ANTENNA FEEDS, RADOMES, ANTENNA RADIATION PATTERNS, PERFORMANCE (ENGINEERING), STANDING WAVE RATIOS, GAIN, RESISTANCE (ELECTRICAL), ELECTRICAL IMPEDANCE, ENVIRONMENTAL TESTS (U)

This report covers the design and production of two prototype omni-directional antennas for implementation of the 3-pulse sidelobe suppression technique with the ATCRBS ground station. The two types of antennas differ in that the mounting flange of Prototype Model I is located at the base for mounting atop a metallic mast, and the mounting flange for Prototype Model II is located at the top for suspension installation within a spherical radome, housing the ground radar equipment. Also, the phasing device in the feed line differs in the two types of antennas to provide the desired beam tilt. The antennas are series fed colinear dipole arrays properly spaced and phased to produce a vertical pattern very nearly coincident with that of the beacon directional antenna. (Author) (U)

AD- 608 084
BURROUGHS CORP PAOLI PA

RADAR VIDEO DIGITIZER AND AZIMUTH DIGITIZER. (U)

DESCRIPTIVE NOTE: Final rept.,
APR 64 153P Pasquine,Paul D. ;
CONTRACT: FA WA4697
PROJ: 105 200D
MONITOR: FAA , RD64 124

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.
DESCRIPTORS: (*AIRPORT RADAR SYSTEMS, COMPUTERS), (*AIR TRAFFIC CONTROL SYSTEMS, RADAR EQUIPMENT), (*DATA PROCESSING, TARGETS), VIDEO METWORKS, AZIMUTH, RADAR SIGNALS, COMPUTER LOGIC, VOLTAGE, STATISTICAL PROCESSES, DIGITAL SYSTEMS, DESIGN, PRODUCTION, TESTS (U)

The report covers the design, fabrications, and preliminary acceptance testing of an automatic target data proces sor comprising one Radar Video Digitizer (RVD) and one Azimuth Digitizer (AD). The processor, a part of the Advanced Radar Traffic Control System (ARTS) at the Atlanta Terminal Area Tower, accepts radar video and azimuth synchro voltages from an Airport Surveillance Radar (ASR), processes the video, and furnishes a target coordinate message in a format suitable for input to the Track-While-Scan Computer (TWSC). The equipment is also designed to function with an Air Route Surveillance Radar (ARSR). The RVD uses statistical methods in detecting targets and incorporates an automatic clutter elimination feature (ACE) which assures a high probability of detecting those targets otherwise obscured by thermal noise or clutter. Targets are detected by an advanced, double-threshold method. (U)

AD- 607 247
AMERICAN INSTITUTES FOR RESEARCH PITTSBURGH PA

PILOT-TO-FORECASTER SERVICE. (U)

DESCRIPTIVE NOTE: Final evaluation rept.,
JUN 64 65P Purifoy,George R. ,Jr.;
Schaeffer,Janice A. ;
CONTRACT: FAA BRD366
MONITOR: FAA , RD64 109

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy. Also see AD-602 839.
DESCRIPTORS: (*WEATHER FORECASTING, AVIATION SAFETY), (*AIR TRAFFIC CONTROL SYSTEMS, WEATHER COMMUNICATIONS), (*AVIATION SAFETY, WEATHER FORECASTING), PILOTS, CIVIL AVIATION, TERMINAL FLIGHT FACILITIES, COMMUNICATION EQUIPMENT, ALL WEATHER AVIATION, INTERCOMMUNICATION SYSTEMS (U)

The Pilot-to-Forecaster Service (PTFS) test was designed to examine a weather support concept of direct radio access by civil pilots to an aviation forecaster. Three separate configurations were evaluated to determine their effectiveness in providing weather information support to aviation and air traffic control: (1) PTFS colocated with an ARTC center and having multiple discrete frequency remote transmitter-receiver outlets, (2) PTFS co-located with a Weather Bureau FAWS and having a single discrete frequency transmitter-receiver outlet, and (3) phone-patch communications between PTFS and multiple Flight Service Stations (FSS). In general, the evaluation findings were that: PTFS, in any of its tested configurations, was a highly effective component of the aviation weather system; Discrete frequency operation was superior to phone-patch operation; and, PTFS colocated with the ARTC center provided a greater amount of useful weather support to the process of air traffic control than did PTFS co-located with the FAWS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 606 629
HRB-SINGER INC STATE COLLEGE PA

A HUMAN FACTORS REVIEW OF THE AN/TSQ-47 AIR TRAFFIC CONTROL/COMMUNICATIONS SYSTEM. (U)

DESCRIPTIVE NOTE: Rept. no. 6 (Final),
JUN 64 64P Busch,Allen C. ;King,
Robert B. ;
REPT. NO. HRB-353-R-6
CONTRACT: AF19 628 439
PROJ: AF-482L
MONITOR: ESD , TDR64 446

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, HUMAN FACTORS ENGINEERING), (*AIR TRAFFIC CONTROLLERS, AIR TRAFFIC CONTROL SYSTEMS), (*COMMUNICATION SYSTEMS, CONTROL SYSTEMS), AIR TRAFFIC, AIRPORT RADAR SYSTEMS, MOBILE, SHELTERS, SAFETY, NOISE, DESIGN (U)
IDENTIFIERS: AN/TSQ-47, AUGMENTED FOUR WHEELS PROJECT, FOUR WHEELS PROJECT, TRACALS (U)

Category I testing has recently been completed on the AN/TSQ-47 Mobile Air Traffic Control/ Communications System. This report presents a review of human factors problems which occurred during the Category I testing phase and in prior development phases of the system. The design changes suggested are based on recommendations made prior to the completion of Category I testing for the purpose of outlining ttentative system deficiencies. Each shelter is reviewed separately, and problems common to all system facilities are discussed. The major topics of review are the operational considerations for each shelter, the working environment, and the design of consoles and work places. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 603 865
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND TECHNOLOGY

SURVEY AND ANALYSIS OF LONG-DISTANCE COMMUNICATION TECHNIQUES. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 64 126P McClure,George W. ;Dute,
John C. ;
REPT. NO. 4987-15-F
CONTRACT: FAA/ARDS-487
PROJ: 113 10 1R
MONITOR: FAA , RD 64 7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*COMMUNICATION SATELLITES (ACTIVE), AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION SYSTEMS), COMMUNICATION AND RADIO SYSTEMS, ATLANTIC OCEAN, SYNCHRONOUS SATELLITES, AVIATION SAFETY, VERY HIGH FREQUENCY, HIGH FREQUENCY, DATA TRANSMISSION SYSTEMS, DIGITAL COMPUTERS, RADIO TRANSMISSION, ANTENNAS, VOICE COMMUNICATIONS, NOISE (RADIO), ECONOMICS, AIR TRAFFIC (U)

Various means of providing a reliable communication system for air traffic control (ATC) in the North Atlantic in the 1970's was investigated. The study indicated that considerable improvement in the adequacy and reliability of communication with over-ocean aircraft (during the interim period before 1970) could be obtained by the adoption of an optimized hybrid system utilizing High Frequencies (in both ground wave and ionospheric modes); Very High Frequencies (present communication band in both line-ofsight and tropospheric scatter modes); and Low Frequencies (ground-to-air). However, the study also indicated that the only economically and operationally feasible technique which will fully satisfy the near-future requirements for communication to over-ocean aircraft and which will be at all adequate for post-1970 requirements, is one which utilizes active satellite relays.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 603 416
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROBLEMS IN AIR TRAFFIC MANAGEMENT. IV. COMPARISON OF PRE-EMPLOYMENT, JOBRELATED EXPERIENCE WITH APTITUDE TESTS AS PREDICTORS OF TRAINING AND JOB PERFORMANCE OF AIR TRAFFIC CONTROL SPECIALISTS, (U)

DEC 63 12P Trites,David K. ;Cobb,Bart B. ;
REPT. NO. CARI-63-31

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROLLERS, PERFORMANCE(HUMAN)), (*PERFORMANCE(HUMAN), AIR TRAFFIC CONTROLLERS), TRAINING, PERFORMANCE (HUMAN), APTITUDE TESTS, EDUCATION, AGING (PHYSIOLOGY), PERSONNEL, STATISTICAL ANALYSIS, CORRELATION TECHNIQUES (U)

A study of over 700 Enroute and Terminal Air Traffic Control Specialist trainees revealed that different kinds of pre-employment, job-related experience had differential value for the prediction of training performance. In general, experience most directly related to air traffic control work was a positive predictor; experience related to communications and piloting was negative. It was also shown that for Enroute trainees only, a composite variable representing the sum of tower GCA, RAPCON/RATCC, and center experience had a statistically significant, but small, relationship with ratings of job performance. In contrast, aptitude tests were superior to the experience variables for the prediction of all training course performance measures of both types of trainees, with the exception of laboratory performance of terminal trainees. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 602 839
AMERICAN INSTITUTES FOR RESEARCH PITTSBURGH PA

PILOT-TO-FORECASTER EVALUATION. (U)

DESCRIPTIVE NOTE: Evaluation rept. for 1 Jul-31 Dec 61,
MAY 62 118P Hoisman,Alan J. ;Schaeffer, Janice A. ;
CONTRACT: FAA/BRD366

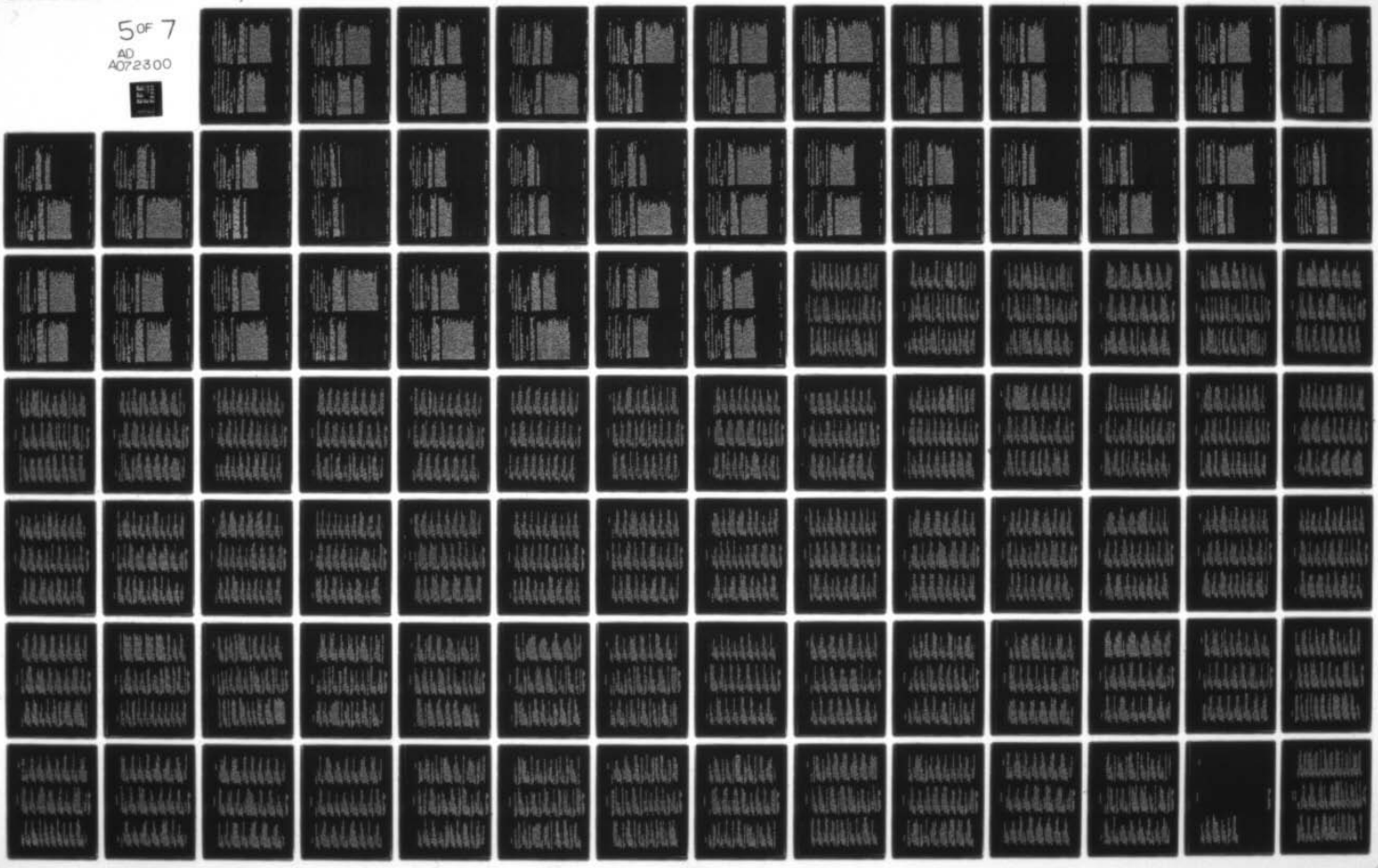
UNCLASSIFIED REPORT

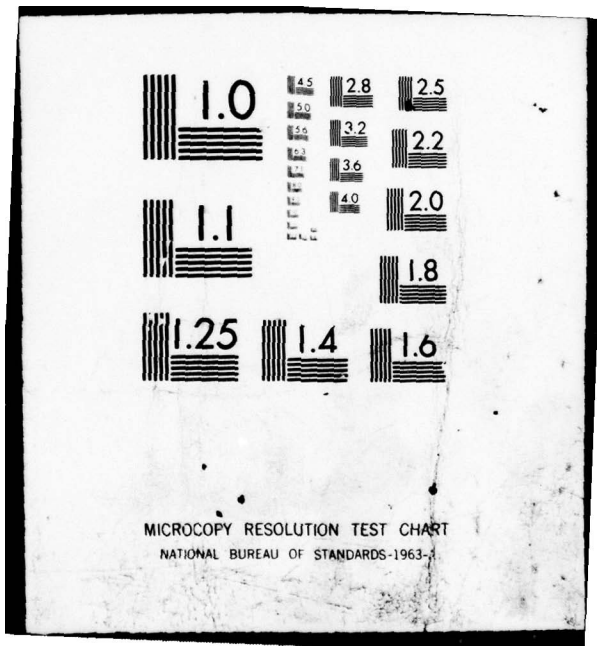
SUPPLEMENTARY NOTE:
DESCRIPTORS: (*WEATHER FORECASTING, AVIATION SAFETY), (*AIR TRAFFIC CONTROL SYSTEMS, WEATHER FORECASTING), (*AVIATION SAFETY, WEATHER FORECASTING), PILOTS, TERMINAL FLIGHT FACILITIES, INTERCOMMUNICATION SYSTEMS, MILITARY PERSONNEL, CIVIL AVIATION (U)

An operational evaluation of the Pilot-to-Forecaster test service is reported. The purpose of the evaluation was to assess the operational benefits to aviation and air traffic control from a program of meteorological information and assistance provided to airborne pilots and Air Route Traffic Control Centers. The approach of the study is reflected in the four general types of data collection techniques used. They were: observation, interviews, records of air-ground forecaster transmissions, and user questionnaires. The major results of the evaluation are: (1) The Service is used by general aviation, air carriers, and occasionally, military pilots; (2) General aviation uses the Service, over all, significantly more than do air carriers; and (3) On the average, the Service is used approximately 25 times a day by pilots. ARTC controllers use it both on a scheduled and on-demand basis. The primary conclusions drawn from the results are that the Service has been successful in meeting its aims and purpose, and that implementation of the Service should be nationwide. (Author) (U)

AD-A072 300 DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA F/G 1/2
AIR TRAFFIC CONTROL SYSTEMS.(U)
JUL 79
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NATIONAL BUREAU OF STANDARDS-1963-A

AD- 602 674
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

RECOMMENDATIONS FOR EQUIPMENT CONFIGURATION STANDARDS FOR TOWER CABS. (U)

DESCRIPTIVE NOTE: Final rept.
APR 64 53P Bradley,J. Roy ;ohman,Richard K. ;
PROJ: 101 910X. pt. A
MONITOR: FAA , RD64 64

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, CONFIGURATION), (*TOWERS, DESIGN), CONTROL SIMULATORS, CONTROL PANELS, MODELS (SIMULATIONS), STANDARDS, HUMAN FACTORS ENGINEERING, DISPLAY SYSTEMS (U)

The report contains the results of a series of air traffic control exercises that were conducted to determine a limited number of equipment arrangements which can be used as agency standards for control towers of four different workload levels. The test facility consisted of a pentagonal tower cab mounted on top of a 110 ft structure located at NAFEC, Atlantic City, New Jersey. Inside the cab, a mock-up was constructed of specially designed consoles and console instrument turrets that could be moved from place to place. The mock-up served as a simulator for testing the efficacy of various equipment configurations. Recommendations are presented in respect to each workload level. (Author) (U)

AD- 601 909
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF INTERIM CONTROL PROCEDURES FOR PROPOSED ILS INSTALLATIONS AT KENNEDY AIRPORT ON RUNWAY 13L AND ON RUNWAY 13 AT LAGUARDIA AIRPORT. (U)

DESCRIPTIVE NOTE: Final rept.
JUN 64 88P Conway,R. C. ;
PROJ: 101 174 01V
MONITOR: FAA RD64 87

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*INSTRUMENT LANDINGS, TERMINAL FLIGHT FACILITIES), (*AIR TRAFFIC CONTROL SYSTEMS, CONTROL SIMULATORS), (*CONTROL SIMULATORS, AIR TRAFFIC CONTROL SYSTEMS), AIR TRAFFIC, AIRPORTS, RUNWAYS, TESTS, CONTROL (U)
IDENTIFIERS: KENNEDY AIRPORT, LAGUARDIA AIRPORT (U)

This report describes a simulation effort for the evaluation of interim control procedures that were developed to serve a proposed Instrument Landing System (ILS) installation on runway 13L at Kennedy International Airport and a proposed ILS installation on runway 13 at LaGuardia Airport without major revision to the total Metroplex. The simulation was conducted using the model B dynamic air traffic control simulator. Two plans were tested, using four different runway combinations, for the purpose of determining the more efficient procedures. It was concluded that both plans are considered to be equally efficient as interim control procedures. It was recommended that consideration be given to using these interim installations in the New York Metroplex. (Author) (U)

AD- 601 853
RADIO CORP OF AMERICA BURLINGTON MASS

INVESTIGATION OF SOME ELECTRONIC AND MECHANICAL INTERFACE PROBLEMS IN THE AN/TSQ-47 SYSTEM, (U)

JAN 64 82P Lauginiger,James J. ; Mahlmann,Charles V. ;Reid,Emmett H.;Varley, Herbert W. ;
CONTRACT: AF19 604 8020
MONITOR: ESD,ESD TDR-64-199,TDR-63-601-S

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, PERFORMANCE (ENGINEERING), COMMUNICATION AND RADIO SYSTEMS, RADIO RECEIVERS, VERY HIGH FREQUENCY, RADIOFREQUENCY INTERFERENCE, ELECTROMAGNETIC PULSES, PULSE COMMUNICATIONS, NOISE (RADIO), NOISE (RADAR), RADAR EQUIPMENT, ULTRAHIGH FREQUENCY, SUPPRESSORS, ELECTROMAGNETIC SHIELDING, SHELTERS, PACKAGING, CONTAINERS, AIR TRANSPORTATION, BAROMETERS, WIND, AIRPORTS, WIND DIRECTION INDICATORS, METEOROLOGICAL INSTRUMENTS, LIGHTING EQUIPMENT (U)

This report discusses certain electronic and mechanical interfaces associated with system integration and ground support of the AN/TSQ-47 air traffic control system. Problem areas are defined and suggestions are set forth for improvement and standardization. Discussions and recommendations for meteorological equipment and a mobile runway lighting system are included. (Author) (U)

AD- 601 043
HRB-SINGER INC STATE COLLEGE PA

FUNCTIONAL CHARACTERISTICS OF A PROFICIENCY FACILITY FOR THE AN/TSQ-47 SYSTEM. (U)

DEC 63 47P Busch,Allen C. ;King, Robert B. ;Fitzgerald,Joanne F. ;
CONTRACT: AF19 628 439
MONITOR: ESD TDR64 179

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MODELS (SIMULATIONS)), DISPLAY SYSTEMS, TARGETS, COMMUNICATION SYSTEMS, RADAR, TRAINING DEVICES, CONTROL SYSTEMS, HUMAN FACTORS ENGINEERING, SIMULATORS (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT (U)

The AN/TSQ-47 specifically and the Emergency Mission Support program in general are establishing the requirements for ATC systems which will handle increasing traffic rates. The nature of mobile operations is such that there are vast separations in time and geographical locations for the use of this equipment. With these increasing demands on personnel and equipment new concepts in training are needed. The report presents the need for the functional description of, and the operational use of a sophisticated proficiency facility. This proficiency facility is essentially comprised of aircraft target generators, a flight path projection computer, simulated communications equipment, simulated tower position, and other auxiliary equipments. This facility in conjunction with an AN/TSW-5 Rapcon shelter is capable of simulating and quantitatively measuring a broad category of terminal ATC operations. (Author) (U)

AD- 600 826
ITT GILFILLAN INC LOS ANGELES CALIF

REGAL TEST PROGRAM SUPPORT. (U)

DESCRIPTIVE NOTE: Final rept., Mar 60-June 63.
APR 64 108P
CONTRACT: FAA BRD245

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AIRPLANE LANDINGS), (*POSITION FINDING, FLIGHT INSTRUMENTS), (*APPROACH INDICATORS, FLIGHT), (*ALL WEATHER AVIATION, AIRPLANE), FLIGHT INSTRUMENTS, LANDING, RELIABILITY, FLIGHT TESTING, ANTENNAS, RADIO (U)
IDENTIFIERS: AUTOMATIC LANDING SYSTEMS, REGAL (U)

The report presents the engineering results of the REGAL test evaluation program. The basic objective of the program was to determine the feasibility of the REGAL system, using an interferometer antenna, to provide airborne derived elevation angle and range data capable of providing accurate guidance for the purpose of landing aircraft. Comprehensive static and dynamic testing has revealed that REGAL has an elevation accuracy of 0.03 degrees for all angles 0.25 degrees above the mean ground plane and that the range techniques present the ability to approach within ±50 feet or 1%, whichever is greater, of the actual range. The latter part of the program was used to determine how well REGAL actually performed in a landing system. Over two hundred completely automatic landings were achieved using four different type aircraft, all equipped with different type landing computers and autopilots. (Author) (U)

AD- 600 774
HRB-SINGER INC STATE COLLEGE PA

INVESTIGATION OF ATC JOB AIDS FOR THE AN/TSQ-47 SYSTEM. (U)

DESCRIPTIVE NOTE: Rept. no. 4
OCT 63 26P Busch,Allen C. ;King,Robert B. ;Kirby,Frederick J. ;
REPT. NO. HRB-353-R-4
CONTRACT: AF19 628 439
MONITOR: ESD TDR63 632

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, AIR TRAFFIC CONTROLLERS), (*AIR TRAFFIC CONTROLLERS, AIR TRAFFIC CONTROL), (*NAVIGATIONAL AIDS, AIR TRAFFIC CONTROLLERS), COMMUNICATION SYSTEMS, IDENTIFICATION SYSTEMS, ANALOG COMPUTERS, RADAR (U)
IDENTIFIERS: AN/TSQ-47, AUGMENTED FOUR WHEELS PROJECT (U)

TheThe report is the result of an investigation of controller job aids for the RAPCON operations of the AN/TSQ-47 EMS system. It presents an analysis of the operator tasks characteristic of mobile RAPCON operations and discusses job aids which might have application in future EMS RAPCONS for facilitation of job performance by reducing the requirements imposed upon the performer. Recommendations are made for the incorporation of computerized, and simplified mechanical aids. (Author) (U)

AD- 600 108
BOLLAY (E) ASSOCIATES INC GOLETA CALIF

CONFIGURATION OF WEATHER FACILITIES FOR METROPLEX TERMINAL AREAS. (U)

DESCRIPTIVE NOTE: Final rept.
JAN 64 91P Slover,W. ;
CONTRACT: FAA/ARDS-554
PROJ: 206 001S
MONITOR: FAA RD64 32

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*WEATHER FORECASTING, TERMINAL FLIGHT FACILITIES), (*TERMINAL FLIGHT FACILITIES, WEATHER FORECASTING), ALL WEATHER AVIATION, AIR TRAFFIC CONTROL TERMINAL AREAS, DATA TRANSMISSION SYSTEMS, DESIGN, OPERATION (U)

This study develops the observing and communication details of a mesoscale weather network to support the air traffic control system in high-density terminal areas. The study begins with a review of terminal-area traffic control functions and required weather information. Required information includes short period forecasts (one hour) for the terminal area; since such forecasts are not available today, the study considers observations to be their equivalent and makes provision for observing the parameters that will likely be inputs to short period forecasting models. Nine metroplex cities are then selected for study, along with the test-bed at NAFEC. The 'ideal' mesoscale network is described and its principles applied to the ten terminal areas being considered. The problems that exist in obtaining needed meteorological measurements are considered, and an optimum remote observing configuration, using existing meteorological sensors, is discussed. Additional measurements needed at the metroplex terminal are also considered. Finally, the engineering configuration and operation of the data collection network is described. Observing site details and terminal area data for the ten sample locations are tabulated in an appendix. (Author) (U)

AD- 600 093
FEDERAL AVIATION AGENCY WASHINGTON D C

INTERNATIONAL AVIATION R AND D SYMPOSIUM (2ND): ALL WEATHER LANDING SYSTEMS, SEPTEMBER 16-18, 1963. (U)

DESCRIPTIVE NOTE: Summary of discussions and program progress rept.
64 186P
MONITOR: FAA
UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*ALL WEATHER AVIATION, AIRCRAFT LANDINGS), (*AIR TRAFFIC CONTROL SYSTEMS, LANDING AIDS), (*SYMPOSIA, ALL WEATHER AVIATION), AVIATION SAFETY, TERMINAL FLIGHT FACILITIES, FLIGHT INSTRUMENTS, AIRCRAFT ANTENNAS, FLIGHT PATHS, METEORLOGICAL PARAMETERS (U)

Contents: summary of discussions, airborne systems, subsystem development, operational aspects; program progress report(FAA all weather landing program, turboject configuration for category III operation, new glide slope antennae, weather requirements for all weather landing system, visual aids system for all weather operations). (U)

AD- 455 168
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

AN ANALYSIS OF NON-JET TRAFFIC CROSSING THE NORTH ATLANTIC ON 7TH AND 8TH SEPTEMBER 1962. (U)

SEP 64 12P Towns,R. ;
REPT. NO. TR64002

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC, DISTRIBUTION), (*AIR TRAFFIC CONTROL SYSTEMS, STATISTICAL ANALYSIS), ATLANTIC OCEAN, DATA, GREAT BRITAIN (U)

An analysis is made of the distribution in space and time, and the incidence of air traffic control restrictions, for propeller driven air traffic over the North Atlantic on the 7th and 8th September 1962. This follows an earlier analysis made for the jet aircraft. (Author) (U)

AD- 435 570
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND TECHNOLOGY

STUDY AND ANALYSIS OF POSITION DATA ACQUISITION TECHNIQUES FOR OVER-OCEAN AIR TRAFFIC CONTROL. (U)

DESCRIPTIVE NOTE: Final rept. Apr 62-Apr 63,
DEC 63 257P Filkins,Lyle D. ;Little, Joseph W. ;Scott,Robert E. ;
REPT. NO. 5088 12F ,RD64 6
CONTRACT: FAA ARDS506
PROJ: 116 9R

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OCEANS), (*POSITION FINDING, OCEANS), RANGE FINDING, NAVIGATION SATELLITES, EQUATORIAL ORBITS, SYNCHRONOUS SATELLITES, CIVIL AVIATION, ATLANTIC OCEAN, RADIO NAVIGATION, RADAR NAVIGATION, HIGH FREQUENCY, IONOSPHERIC PROPAGATION, FLIGHT PATHS (U)

Techniques were studied for supplying positional data on aircraft traversing oceanic areas to an air traffic control system. The pujpose was to determine which techniques might be tecnnically feasible during the time period from the present to 1975. It was concluded that: (1) Hybrid navigation systems presently available will determine the position of an airplane with acceptable accuracy, but a considerable improvement in long-range air-to-ground communications (probably achievable only by a synchronous satellite system) must occur before an advanced reported air-observed position determination system can be implemented. (2) A network of shipborne Rho-Theta observation units is technically capable of immediate implementation for the North Atlantic minimum time path envelope between New York and London (or any similar route), but a number of operational and other nontechnical problems must be solved before this approach could be recommended. (3) Highfrequency techniques are unacceptable for this application. (Author) (U)

AD- 429 906
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

CONTROL LOAD, CONTROL CAPACITY AND OPTIMAL SECTOR DESIGN. (U)

DESCRIPTIVE NOTE: Interim rept.,
DEC 63 90P Arad,Bar-Atid ;Golden, Benjamin T. ;Grambart,James E.;Mayfield, Clifton E. ;van Saun,H. Richard;
REPT. NO. RD64 16
PROJ: 102 11R
MONITOR: NAFEC RD64 16

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, OPERATION RESEARCH), AVIATION SAFETY, AREA COVERAGE, FLIGHT PATHS, MODELS (SIMULATION), MATHEMATICAL ANALYSIS, AIR TRAFFIC, MEASUREMENT, SCHEDULING, CORRELATION TECHNIQUES, RELIABILITY, TERMINAL FLIGHT FACILITIES, OPTIMIZATION, AIR TRAFFIC CONTROLLERS, DISTRIBUTION, AIRSPEED (U)
IDENTIFIERS: SCALING (U)

The complexity of total traffic phenomena in a controlled airspace is described by a model that relates the variables of the traffic (number of aircraft, distribution, speed), the rules of operation (separation minima) and the airspace (volume and flow organization) to the load which is imposed on the control position of the sector. Basic units of control load and control work are defined and used for quantification of the control effort required. The relationship between the load imposed on the control position and the geometry and the orientation of the sector is demonstrated and a method for optimizing the design of the sector is analyzed and described in a numerical example. The control capacity is quantified in units of control load and method of matching the size of the sector to the capacity for maximum efficiency of sector design is demonstrated and discussed. A paired comparison study is used to scale the amount of control work involved in handling the traffic in each of 20 control problems. (Author) (U)

AD- 427 680
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

TERMINAL AIR TRAFFIC CONTROL AND PROBLEMS OF SYSTEM DESIGN, (U)

OCT 63 19P Alexander,L. T. ;Porter,E. H. ;
REPT. NO. TM639 008 00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*TERMINAL FLIGHT FACILITIES, AIR TRAFFIC CONTROL SYSTEMS), (*AIR TRAFFIC CONTROL SYSTEMS, AUTOMATION), DATA PROCESSING, OPERATIONS RESEARCH, MODELS (SIMULATOR), DECISION MAKING, DESIGN, THEORY, DIGITAL COMPUTERS, MODEL TESTS, PERFORMANCE, EFFECTIVENESS (U)

Terminal air traffic control must turn toward automation soon. The design of an effective control system may be determined most efficiently by initial simulation in the laboratory. That it is possible to simulate such a system in the laboratory is demonstrated by the Terminal Air Traffic Control System established in SDC's Systems Simulation Research Laboratory. The system was tested in a series of 24 two hour runs under different traffic configurations and input patterns. The results of these runs suggest that prescheduling of approach paths is not as efficient as permitting controllers to determine the approach paths according to the situation of the moment. Safety, orderliness and expeditiousness measures were programmed into the computer and were taken during the simulated operations. Such measures, taken during actual operations, could be adapted to alert operators when the system is approaching some undesired level of effectiveness. (Author) (U)

AD- 427 677
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

DESCRIPTION OF THE TERMINAL AIR TRAFFIC CONTROL LABORATORY SYSTEM. (U)

SEP 63 53P
REPT. NO. TM639 002 00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MODEL TESTS), (*TERMINAL FLIGHT FACILITIES, AIR TRAFFIC CONTROL SYSTEMS), MATHEMATICAL REDUCTIONS, DATA PROCESSING, DISPLAY SYSTEMS, OPERATIONS RESEARCH, TEST EQUIPMENT, COMMUNICATION AND RADIO SYSTEMS, CATHODE RAY TUBES, PROGRAMMING (COMPUTERS), FLIGHT PATHS, DECISION MAKING, DIGITAL COMPUTERS, SIMULATION, TEST FACILITIES (U)

A model of a future terminal air traffic control system was chosen as the vehicle for examining man-computer interactions which are basic to an adaptive capability. A real referent system was chosen, instead of an abstract system, so that experimental variables could be evaluated within the context of an operational environment. An air traffic system was chosen because it is typical of information-processing, decision-making systems. A future environment was chosen so as to provide greater likelihood of cooperative mancomputer information processing. Based upon a systematic survey of authorative forecasts, a set of assumptions was made about the future air traffic environment and the structure and operating characteristics of a future terminal system. These assumptions provided a framework for the design of the laboratory model. The laboratory subsystem exercises control over all airborne aircraft in the terminal area. It is the performance of this subsystem (the Terminal Control Center located at the San Francisco airport) which was studied. The center is manned by six people: two local controllers, two conversion controllers, a traffic coordinator, and an assistant to the supervisor. (Author) (U)

AD- 425 630
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

IMPROVED TRACE (TAXIING AND ROUTING OF AIRCRAFT COORDINATION EQUIPMENT) DETECTORS. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 63 34P Reamer,E. L. ;
PROJ: 426 1X

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIRPORT RADAR SYSTEMS, DETECTORS), (*AIR TRAFFIC CONTROL SYSTEMS, DETECTORS), INDUCTANCE, ELECTRIC CABLES, DOPPLER RADAR, CONTINUOUS WAVE RADAR, FREQUENCY MODULATION, S BAND, X BAND, AUTOMATIC, ALL WEATHER AVIATION, AVIATION SAFETY, UNDERGROUND STRUCTURES, TAXIING, SCHEDULING, DETECTION (U)
IDENTIFIERS: TRACE DETECTORS (U)

Results are reported of technical and operational tests of a system designed to detect aircraft movements on the airport surface and in the approach zone of a runway. This system, known as TRACE (Taxiing and Routing of Aircraft Coordination Equipment), consisted of three equipments employing different techniques for aircraft detection. The techniques employed were: (1) a modified induction loop detector, (2) a modified cw doppler detector (S-band), and (3) an fm/cw doppler detector (X-band). Operational tests were conducted on each of the three types of detector units to determine their capabilities of detecion and coverage patterns. Aircraft were taxied at various speeds through the detection fields as well as flown at various altitudes in the approach zone of the runway to determine the respective coverage patterns. In addition to gathering information on the reliability of each type of unit, tests were made to determine the effects of climatic variations and lightning discharges, and the susceptibility of units to false triggering due o rain, foliage, and/or bird movements. Test results indicate that the fm/cw doppler detection technique requires major modification to become suitable for use in a detection system. (Author) (U)

AD- 423 299
PAGE COMMUNICATIONS ENGINEERS INC WASHINGTON D C

LONG-DISTANCE VHF COMMUNICATIONS GROUND ANTENNA ARRAY. (U)

DESCRIPTIVE NOTE: Final rept.
JUN 63 1V
REPT. NO. TR-2370
CONTRACT: FAA BRD373
PROJ: DA-3-M-362100301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*ANTENNAS, RADIO COMMUNICATION), (*COMMUNICATION AND RADIO SYSTEMS, ANTENNAS), (*VOICE COMMUNICATIONS, ANTENNAS), (*AIR TRAFFIC CONTROL SYSTEMS, ANTENNAS), VERY HIGH FREQUENCY, ANTENNAS, ANTENNA FEEDS, ANTENNA COMPONENTS, OPERATION, PREAMPLIFIERS, SWITCHING CIRCUITS, NOISE (RADIO), STANDING WAVE RATIOS, ERRORS, ELECTRIC POTENTIAL, GAIN, ANTENNA RADIATION PATTERNS, TEST METHODS (U)

The antenna described is for use in the troposcatter mode, vhf communication at distances up to 600-naut mi for air-traffic control. It is a ground situated array of fixed azimuthal position and is capable of reception as well as transmission. The array is composed of eight vertical 60 degree corner reflectors, each containing 16 half-wavelength vertical dipoles. One corner section is used for transmitting and all eight for receiving. A system of preamplifiers and phasing networks is used to provide the required multiple receiving beams. Results of antenna pattern measurements made at the Barnstable site are included, together with the final test procedures for proper antenna operation and power handling capability. (Author) (U)

AD- 423 278
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

PERFORMANCE AND REQUIREMENT ANALYSIS OF VIDEO DECODERS FOR USE WITH ATC RADAR BEACON SYSTEM. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 63 1V Ashley,Allan ;Cole,Lanier G. ;
CONTRACT: FAA BRD329
PROJ: 8893 2
TASK: 2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, TARGET DISCRIMINATION), (*TARGET DISCRIMINATION, AIRPORT RADAR SYSTEMS), (*AIRPORT RADAR SYSTEMS, PERFORMANCE (ENGINEERING)), CIRCUITS, AIR TRAFFIC, VIDEO SIGNALS, INTERFERENCE, MATHEMATICAL ANALYSIS, RADAR SCANNING, RADAR TRACKING, CODING, RANGES (DISTANCE), RADAR EQUIPMENT, RADAR RECEIVERS, RADAR ANTENNAS, MODULATION, ATTENUATION, STATISTICAL ANALYSIS, MULTIPLEXING, PHOTOGRAPHS, DATA, RADAR BEACONS (U)

Presented are the results of a study of the performance and requirements for decoders in the ATC Radar Beacon System. Many related topics are also presented. The study, essentially analytical, views the decoder from a functional standpoint in the performance of the overall system rather than as a piece of hardware. An extensive list of conclusions and recommendations is presented as a guide for system and component design in order that a continuously improving system may evolve. (Author) (U)

AD- 422 676
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

SCHEMATIC SIMULATION: A TECHNIQUE FOR THE DESIGN AND DEVELOPMENT OF A COMPLEX SYSTEM, (U)

SEP 63 11P Alexander,L. T. ;
REPT. NO. SR TM639 005 00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, TERMINAL FLIGHT FACILITIES), (*OPERATIONS RESEARCH, AIR TRAFFIC CONTROL SYSTEMS), RESEARCH MANAGEMENT, COMMUNICATION SYSTEMS, DATA PROCESSING, SIMULATION, TEST METHODS, CIVIL AVIATION, HUMAN FACTORS ENGINEERING (U)

Schematic simulation is the name of a method for studying system specifications and explicating implications of the specifications for subsystem design. The method was developed in response to the expressed need of the designers of the Terminal Air Traffic Control (TATC) laboratory system. The method provides a model of the projected system and a procedure by which the designers can view system operations from the standpoint of the eventual operators. An illustration is given of how schematic simulation was used. (Author) (U)

AD- 419 100
FEDERAL AVIATION AGENCY WASHINGTON D C

NAS CHART OVERLAYS FOR THE SYSTEM DESIGN TEAM, (U)

JUL 63 1V Lamb,Harry L.;
PROJ: 150 35

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, MAPS), OPERATIONS RESEARCH, AIR TRAFFIC, NAVAGATIONAL AIDS, COMMUNICATION SYSTEMS, RADAR STATIONS, SEARCH RADAR, WEATHER (U)

This report presents reproductions of 20 of 35 overlays being made for the System Design Team to describe the Air Traffic Control System. In addition to the reproductions the report contains a descriptive back-ground and data and sources from which the overlays are pre pared. The original overlays consist of clear plastic mylar film upon which are plotted various aspects of the National Aviation System both present and planned. With these overlays which are based on the Aeronautical Planning Chart (AP 9) one may visualize many parts of the system at one time in many combinations. (Author) (U)

AD- 418 427
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EVALUATION OF TERMINAL FACILITY CONSOLES AND THE PAINTING AND LIGHTING ARRANGEMENT. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 63 59P Cervi,J.J.;Massimino,M.J.;
PROJ: 111 010 02V

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, (*AIRPORT CONTROL TOWERS, HUMAN FACTORS ENGINEERING), AIR TRAFFIC CONTROLLERS, PAINTS, LIGHTING EQUIPMENT, EFFECTIVENESS, DISPLAY SYSTEMS. (U)
IDENTIFIERS: DULLES AIRPORT (U)

Investigations were conducted at Dulles International Tower to evaluate the operational utility of the newly developed ATC Tower Cab Consoles, Type T-1, and the IFR Room Console. In addition, the painting and lighting arrangements of the tower cab and IFR room environments were appraised. The evaluation consisted of direct observations and human factors engineering studies of the operational utility of the equipment in conjunction with an examination of the environmental effects the painting and lighting have upon controller performance. Results of the evaluation indicated that the consoles, and the painting and lighting arrangements are satisfactory for operational use in this facility. However, the deficiencies noted should be corrected prior to implementation in subsequent facilities. (Author) (U)

AD- 417 680
FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND DEVELOPMENT

INFORMATION DISPLAY IN THE AIR TRAFFIC CONTROL SYSTEM. A COORDINATED RESEARCH AND DEVELOPMENT APPROACH, (U)

MAR 62 1V Buckley,Edward P.;Green, Thomas H.;
CONTRACT: FAA BRD423

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: all DDC reproductions will be in black and white. Original may be seen in DDC Hq.
DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DISPLAY SYSTEMS), (*DISPLAY SYSTEMS, HUMAN), (*AIR TRAFFIC CONTROLLERS, DECISION MAKING), JOB ANALYSIS, AUTOMATION, COMMUNICATION THEORY, STATISTICAL ANALYSIS. (U)
IDENTIFIERS: CODES, MAN MACHINE FUNCTION (U)

This paper presents a plan of attack on the problem of displays for use in advanced air traffic control systems. The method, known as CODE ('Controller Decision Evaluation'), consists of the experimental comparison of display information and formats under conditions of scoreable static simulations. The experimental displays are simulations of radar scopes projected from film strips for multiple viewing. Independent variables are the type, amount, and/or level of detail of information presented to the controller; dependent variables are success in predicting conflictions and/or delays. The technique makes it possible to assess the effectiveness of ATC Systems which as yet are only visualized, as well as of systems now being developed or in actual operation. Two experiments are reported utilizing the method. An experimental program is presented to study the effects of progressively advanced degrees of automated information processing upon controller decision-making. A matrix is presented showing the steps to be taken for the orderly development of a fully automated system. The CODE experiments to be performed prior to the development of each level of automation, as indicated in the matrix, are discussed. (Author) (U)

AD- 413 021
HRB-SINGER INC STATE COLLEGE PA

HUMAN FACTORS CONSIDERATIONS IN THE DESIGN OF A MAINTENANCE FACILITY FOR THE AN/TSQ-47 SYSTEM. (U)

DESCRIPTIVE NOTE: Rept. no. 2,
APR 63 34P King,Robert B.;Busch,Allen C.;
REPT. NO. HRB-353-R-2
CONTRACT: AF19 628 439
MONITOR: ESD TDR-63-326

UNCLASSIFIED REPORT

DESCRIPTORS: TDR63 326, (*AIR TRAFFIC CONTROL SYSTEMS, COMMUNICATION SYSTEMS), MOBILE, MAINTENANCE, ANALYSIS, EFFECTIVENESS, HUMAN, DESIGN. (U)
IDENTIFIERS: AN/TSQ-47, MAINTENANCE FACILITIES, PROBLEMS (U)

This report presents a discussion of the functional requirements of a maintenance facility for the AN/TSQ-47 Mobile Air Traffic Control/ Communi cations System. It analyzes the equipment and intended operational use of the system and indicates how problems involved in achieving maintenance efficiency should influence the functions of a system maintenance facility. The report also offers human engineering design considerations for such a facility. (Author) (U)

AD- 410 169
MITRE CORP BEDFORD MASS

ESTIMATED AIR TRAFFIC LOADS OVER AIR DIVISIONS IN THE YEARS 1960 TO 1975. (U)

AUG 59 64P Coulopoulos,W.D.;Simons, P.R.;Stylos,P.;Israel,D.R.;
REPT. NO. SR10
CONTRACT: AF33 600 39852
MONITOR: ESD TDR63 391

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC, MANAGEMENT ENGI), (*AIR TRANSPORTATION, MATHEMATICAL), (*AIR TRAFFIC CONTROL SYSTEMS, DESIGN), AIR FORCE RESEARCH, OPERATIONS RE, TABLES(DATA), AIR DEFENSE COMMAND, SCHEDULING. (U)

Estimates of peak air traffic loads over air division areas were generated to aid in the de sign of an integrated air traffic control/air defense system. Basic data sources are Federal Aviation Agency IFR peak day measurements and the Curtis Report. This information was updated with recent traffic measurements and converted to obtain estmates of the number of instantaneous airborne aircraft during a peak hour of a peak VFR day for the years 1960, 1965, 1970, and 1975 with military, general aviation, and air carrier categories, divided into altitude strata below 15,000 feet, 15,000 to 24,000 feet, and above 24,000 feet. The hourly variation in traffic loads is presented and used to determine the number of airborne aircraft in each air division during periods of medium and low traffic activity on a peak VFR day in 1965. (Author) (U)

AD- 409 799
HRB-SINGER INC STATE COLLEGE PA

HUMAN FACTORS CONSIDERATIONS IN THE DESIGN OF A TRAINING AND PROFICIENCY FACILITY FOR THE AN/TSQ-47 SYSTEM. (U)

DESCRIPTIVE NOTE: Technical rept., no. 3,
APR 63 24P Kresse,Frederick H.;
REPT. NO. HRB-353-R-3
CONTRACT: AF19 628 439
MONITOR: ESD TDR63 328

UNCLASSIFIED REPORT

DESCRIPTORS: (AIR TRAFFIC CONTROL SYSTEMS, HUMAN FACTORS ENGINEERING), (*AIR TRAFFIC CONTROLLERS, TRAINING), MOBILE, DESIGN, TRAINING DEVICES. (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT (U)

The mobile nature of the Air Force's AN/TSQ-47 Air Traffic Control system calls for periods of peak performance on the part of its air traffic controllers. These periods are separated by sometime prolonged intervals during which con troller skill can deteriorate. This report deals with the design of a Training and Pro ficiency Facility to maintain controller skill between system deployments. Specifically, it formalizes the present conception of the facil ity, it discusses design considerations that may add to or modify the present conception, and it sets forth recommendations for further effort. (Author) (U)

AD- 408 622
MITRE CORP BEDFORD MASS

THE INTEGRATION OF AIR TRAFFIC CONTROL AND AIR DEFENSE, (U)

SEP 59 29P Israel,D.R.;
REPT. NO. SR6
CONTRACT: AF33 600 39852
MONITOR: ESD TDR63 390

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, DATA PROCESSING), (*AIR CONTROL CENTERS, RADAR NAVIGATION), AIR DEFENSE COMMAND, ANTIAIRCRAFT DEFENSE SYSTEMS, EARLY WARNING, NATIONAL DEFENSE, DIGITAL COMPUTERS, AUTOMATIC, CIVIL AVIATION, RADAR BEACONS, DISPLAY SYSTEMS, CODING. (U)
IDENTIFIERS: AN/FSQ-7, SAGE, SATIN (U)

The Federal Aviation Agency and the United States Air Force have taken definite steps toward the integration of air traffic control with air defense. Three of these steps are: (1) the successful completion of an experiment called CHARM which demonstrated that the SAGE air defense system could assist the present air traffic con trol system; (2) the formulation of a plan, based partly on CHARM results, to make use of nine SAGE super combat centers planned for operation in the mid-1960's to centralize integrated facilities; and (3) the beginning of an experimental program called SATIN to test integration techniques and equipment. The SAGE direction center contains a large, high-speed, general purpose digital com puter which centralizes the processing of radar data and coordinates the control of air defense weapons over an area several hundred miles square. (Author) (U)

AD- 408 567
MITRE CORP BEDFORD MASS

THE CHARM SYSTEM OPERATION AND RESULTS. (U)

JUN 59 18P Stylos,P.;Nicol,W.S.;
Israel,D.R.;
REPT. NO. SR5
CONTRACT: AF33 600 37882
MONITOR: ESD TDR63 389

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIR TRAFFIC CONTROL SYSTEMS, NUMERICAL INTEGRATION), (*AIR CONTROL CENTERS, IN), RADAR TRACKING, COMPATIBILITY, DATA PROCESSING, DISPLAY SYSTEMS, AIR DEFENSE COMMAND, ANTIAIRCRAFT DEFENSE (U)
IDENTIFIERS: SAGE (U)

CHARM was an experimental vehicle designed to study the prolems of air traffic control/air defense integration. It was an early, if not the first, application of high-speed data processing techniques, such as those developed in the SAGE air defense system, to the en route air traffic control problem. This document presents an over-all review of the results of operating the CHARM System from December 1958 through May 1959. Significant statistical data were not gathered: the Whirlwind I computer was shut down prior to the start of a compre hensive test series designed to gather quantita tive data, and most of the normal periods of system operation were devoted to demonstrations of CHARM to representatives of Government agencies and industry. The necessarily dif ferent mode of operation required for demon strations made it impossible to collect detailed or useful data. (Author) (U)

AD- 407 627
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ACTIVITY REPORT. (U)

FEB 62 31P
MONITOR: FSD TDR62 20

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *LANDING AIDS, GLIDE PATH SYSTEMS, INSTRUMENT, LIGHTING, RUNWAYS, APPROACH LIGHTS, COMMUNICATION AND RADIO SYSTEMS, NAVIGATION AIDS, HELICOPTERS, DATA PROCESSING, RESEARCH (U)

Contents: Approach and landing systems Communications Data acquisitions and processing Navigation Helicopter operations Research division activities Simulation Aircraft safety Weather (U)

AD- 403 655
SYSTEMS ANALYSIS AND RESEARCH CORP CAMBRIDGE MASS

COMPARATIVE COST ANALYSIS OF MICROWAVE AND WIRE LINE RADAR REMOTING TECHNIQUES. (U)

DESCRIPTIVE NOTE: Final rept.,
MAR 63 68P Drake,John W.;Schein, Robert L.;
CONTRACT: FAA/ARDS-628
PROJ: 151 1S

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *MICROWAVE COMMUNICATIONS, *DATA TRANS, *FIELD WIRE COMMUNICATION, RADAR BEACONS, DATA, MICROWAVE NFT, INSTALLATION, RADIO EQUIPMENT, DATA, MAINTENANCE, OPERATION, ANALOG SYSTEMS, DIGITAL SYSTEMS, COSTS. (U)

Comparison is made of the cost to the FAA, of wireline remoting of digitalized radar and bea con data (and beacon only) to Air Route Traffic Control Centers with the costs for microwave re moting of the same information in analog form. The second technique includes facilities for sub sequent converting of the data to digital form at the center. The costs considered are those not yet sunk or committed, i.e., future costs. Costs for both methods alone, and for a mixed system, are developed for each of two nationwide remoting networks - that presently programmed including new links for which the FAA may be committed through F.Y. 1964, and a hypothetical network to provide radar coverage to 5, 000 ft MSL or 3,000 ft above the terrain, whichever is higher. Costs are developed for each microwave repeater and terminal pair of each link, based on individual variations in terrain and hardware requirements. The investigation concludes that the difference in cost between the two transmission methods is small. Where a difference does exist it gen eally favors the wireline technique. In cases of extreme link length and/or very difficult terrain, wireline is considerably less costly. For the great majority of all other links, if non-cost considerations are of any appreciable importance, costs should probably not govern any ultimate decision. (Author) (U)

AD- 299 074
ELECTRONICS AND ORDNANCE DIV AVCO CORP CINCINNATI OHIO

OPERATIONAL TEST AND EVALUATION OF AIR TRAFFIC CONTROL CENTRAL AN/GSN-11 (U)

JAN 63 1V
CONTRACT: AF19 604 7379
MONITOR: ESD TDR63 187

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *GROUND-CONTROLLED APPROACH RADAR, AIRPLANE LANDINGS, AIRPORT RADAR SYSTEMS, ALL WEATHER AVIATION, ANALYSIS, AVIATION SAFETY, FLIGHT SPEEDS, FLIGHT TESTING, GROUND SPEED, MOVING TARGET INDICATORS, OPERATION, POSITION FINDING, RADAR BEACONS, RADAR LANDING CONTROL, RADAR RANGE CALIBRATORS, RADAR SCANNING, RADAR TRACKING, STATISTICAL DATA, TESTS (U)
IDENTIFIERS: AN/GSN-11 (M)

LIVE FLIGHT TESTS ON AIR TRAFFIC CONTROL CENTRAL AN/GSN-11. SOME OF THE LIMITATIONS OF RADAR SYSTEM IMPLEMENTATION UNDER GCA ARE PRESENTED.

AD- 297 430
LOCKHEED ELECTRONICS CO PLAINFIELD N J

RADAR AIR TRAFFIC CONTROL CENTER DISPLAY SYSTEM (U)

SEP 90 1V HAVLICK,R.;
CONTRACT: NOBSR77632

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *CIRCUITS, *DISPLAY SYSTEMS, *PLAN POSITION INDICATORS, *RADAR EQUIPMENT, DESIGN, RADAR LANDING CONTROL, RADAR SCANNING, RADAR SIGNALS, RADAR TARGETS, TELEVISION CONVERTERS, TELEVISION DISPLAY SYSTEMS, TEST METHODS, TESTS (U)

RADAR AIR TRAFFIC CONTROL CENTER DISPLAY SYSTEM: DESIGN, DEVELOPMENT, CONSTRUCTION AND TESTING OF TWO CONTROL SYSTEMS.

AD- 297 070
NORTH AMERICAN AVIATION INC LOS ANGELES CALIF

PHASE I OF INVESTIGATION OF THE EFFECTS OF ENVIRONMENT OF THE REDESIGN OF AN/TSQ-47 (U)

FEB 63 1V
CONTRACT: AF19 628 1635
MONITOR: ESD TDR62 350

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, AIRPORTS, CLIMATE, DESERTS, LANDING FIELDS, PERMAFROST, RUNWAYS (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT (U)

A study is presented of environmental effects on redesign of the AN/TSQ-47, Air Traffic Control/Communications System. The areas of expected deployment of the AN/TSQ-47 were derived from historical conflict data; airbases throughout the world at which the system may operate were compiled, and climatic data for selected locations were chosen to represent conditions which may be encountered by the system. This report presents a summarization of data on more than 10,000 bases with a cursory analysis of probable deployment. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 294 628
GENERAL PRECISION INC PLEASANTVILLE N Y GENERAL PRECISION LAB DIV

AUTOMATIC TABULAR BAY GROUP, TYPE IV C (U)

SEP 62 1V
CONTRACT: FAA BDR310

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *DATA PROCESSING, *DATA STORAGE SYSTEMS, CODING, DIGITAL COMPUTERS, DISPLAY SYSTEMS, ELECTRONIC EQUIPMENT, PROGRAMMING (COMPUTERS), SWITCHING CIRCUITS, WIRING DIAGRAMS (U)

A DIGITAL COMPUTER FOR AIR TRAFFIC CONTROL.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 294 365
FEDERAL AVIATION AGENCY ATLANTIC CITY N J

EVALUATION OF THE TERMINAL RADAR SERVICE AREA CONTROL CONCEPT (U)

SEP 62 1V BOTTOMLEY,D.;HANSEN,R.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, AIRPORT RADAR SYSTEMS, EFFECTIVENESS, GROUND-CONTROLLED APPROACH RADAR, HUMAN FACTORS ENGINEERING, MANAGEMENT ENGINEERING, SIMULATION (U)

TERMINAL RADAR SERVICE AREA CONTROL CONCEPTSIMULATION EVALUATION.

AD- 291 908
NAVY ELECTRONICS LAB SAN DIEGO CALIF

CONTROL, SWITCHING, AND DISPLAY EQUIPMENT FOR VISUAL COMMUNICATIONS IN AIR TRAFFIC CONTROL (U)

OCT 62 1V MERROW,C.M.;
REPT. NO. 1140

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, AIR TRAFFIC CONTROLLERS, AIRPORT RADAR SYSTEMS, COMMUNICATION EQUIPMENT, COMMUNICATION SYSTEMS, DESIGN, DISPLAY SYSTEMS, MONITORS, SWITCHING CIRCUITS, VISUAL SIGNALS(U)

Modular control, switching, and display components were designed and developed. These components can be combined to form visual communications systems that enhance the efficiency of air traffic control coordination. Two practical, sample systems are described. Objective engineering design and installation procedures for such syste s ere devised. (Author 0AD-291 908SN1 +++
Control, switching and displa equipment for visual communications in air traffic control. (U)

AD- 290 683
FEDERAL AVIATION AGENCY WASHINGTON D C

COST ANALYSIS OF THE ASR 4 TERMINAL AREA RADAR (U)

NOV 62 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AIRPORT RADAR SYSTEMS, *GROUND-CONTROLLED APPROACH RADAR, AIRCRAFT, DETECTION, PLAN POSITION INDICATORS (U)

This report was prepared to support an SRDS requirement for ''in service improvement'' of the ATS Approach and Departure Control service. The report contains cost data on the establishment, maintenance and operation of the ASR 4 radar system. The information is broken out by major equipment components. Photographs of the equipment and functional descriptions are also presented. (Author) (U)

AD- 289 513
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

TERMINAL AIR TRAFFIC CONTROL. A LABORATORY MODEL FOR MAN-MACHINE SYSTEM RESEARCH (U)

NOV 62 1V ALEXANDER,L.T.;ASH,M.;
REPT. NO. SP 1016

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, AUTOMATIC, AVIATION SAFETY, COMMUNICATION SYSTEMS, INTERCEPTION PROBABILITIES, MATHEMATICAL MODELS, MATHEMATICAL PREDICTION, SCHEDULING, SIMULATION, TEST FACILITIES, TESTS (U)

A laboratory model of a Terminal Air Traffic Control System was designed to be used as a vehicle for research in man-machine systems. The initial configuration of this system was described together with measures which were developed to test its response characteristics. Plans for comparing the performance of the live system with and without an analytical scheduling and routing model were discussed. (Author) (U)

AD- 287 550
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

A SYSTEM FOR PREVENTING AIRCRAFT COLLISIONS (U)

AUG 62 1V WELCH,JOHN FRANCIS;
REPT. NO. GAE EE 62 1

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AVIATION ACCIDENTS, *SAFETY DEVICES, AIRCRAFT, AUTOMATIC, AVIATION SAFETY, DESIGN, DETECTION, DETECTORS, FLIGHT, FLIGHT INSTRUMENTS, HAZARDS, JET AIRCRAFT, MONITORS, COMMUNICATION AND RADIO SYSTEMS, RADIO NAVIGATION (U)

PREVENTION OF MID-AIR AIRCRAFT COLLISIONS BY A RADIO COMMUNICATION SYSTEM.

AD- 286 265
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS

SOME TASKS AND STUDIES CONDUCTED AT NAFEC ON AIRPORT OPERATIONS EQUIPMENT, SYSTEMS, AND TECHNIQUES (U)

JUN 62 1V
REPT. NO. TDR62 24

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *GLIDE PATH SYSTEMS, *MARKER LIGHTS, *RADAR NAVIGATION, AIRPORT RADAR SYSTEMS, AVIATION SAFETY, DATA PROCESSING, DISPLAY SYSTEMS, RADAR EQUIPMENT (U)

APPROACH AND LANDING SYSTEMS: AN/GSN-5 (ST), BLEU Landing System, REGAL, FLARESCAN, and AN/APN-114. AIRPORT LIGHTING SYSTEMS: Sylvania Simplifie Approach Lights, Centerline Taxiway Lighting, Runway Crossbars and Distance-To-Go Signs, Electro-Luminescent Surface Lights, and Flush Mounted Threshold Lights. COMMUNICATIONS: Peripheral Communications Facility. DATAACQUISITION AND PROCESSING: AN/GSN-11, Data Processing Central, ATC Radar Beacon System, Side Lobe Suppression Techniques, Interference Reduction in ATC Radars, and Bright Radar Display. NAVIGATION: VORTAC, Minimum Air Navigation, Airborne Collision Avoidance, Pictorial Displays and Course Line Computers. Fog Simulation. Link Fog Simulator. AIRCRAFT SAFETY: Bird Ingestion Program, Investigation of Seat Belt Webbing Service Life, Jet Transport Arresting Gear, and Aircraft Safety Research. WEATHER: Upper Air Observing Equipment, Automatic Meteorological Observing System, AN/TPQ-11 Radar Cloud Detection, and AN/FMQ-5 Semiautomatic Meteorological Station. (Author) (U)

AD- 285 276
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS

ACTIVITY REPORT (U)

AUG 62 1V
REPT. NO. TDR62 26

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *GLIDE PATH SYSTEMS, *MARKER LIGHTS, *RADAR NAVIGATION, AIRPORT RADAR SYSTEMS, AVIATION SAFETY, DATA PROCESSING, DISPLAY SYSTEMS, DOPPLER NAVIGATION, LANDING AIDS, COMMUNICATION AND RADIO SYSTEMS, WEATHER FORECASTING (U)
IDENTIFIERS: AN/GSN-5, AN/APN-114, AN/TPQ-11, AN/GSN-11 (U)

Contents: Approach and landing systems
Airport lighting systems Communications
Data acquisition, processing and display
Navigation Research Aircraft safety
Weather Support activities (U)

AD- 285 218
ELECTRONICS AND ORDNANCE DIV AVCO CORP CINCINNATI OHIO

THE DATA FLOW ANALYSIS OF A MOBILE ATC AID (U)

AUG 62 1V BUSCH,ALLEN C.;MCNAIR,ROBERT J.; KIRBY,FREDERICK J.;
REPT. NO. TDR62 190AE 207 62 7
CONTRACT: AF19 628 244
MONITOR: ESD TDR62 190

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AIR TRAFFIC CONTROLLERS, ANALYSIS, COMMUNICATION SYSTEMS, COMPUTERS, DISPLAY SYSTEMS, EFFECTIVENESS, ELECTRONIC EQUIPMENT, FLIGHT PATHS, HUMAN FACTORS ENGINEERING, MATHEMATICAL ANALYSIS, OPERATIONS RESEARCH, SCHEDULING (U)
IDENTIFIERS: AN/TSW-5 (U)

An analysis of internal data flow of Air Traffic Control Central AN/TSW-5 (modified to include a flight path prediction computer and a time schedule display unit) indicates that the modified semiautomatic shelter operations are improved in the following ways: improved controller ability to efficiently interleave arriving and departing aircraft; improved controller cognizance of the entire traffic situation; improved operational effectiveness under jamming; an acceptance rate in excess of 50 aircraft per hr by the AN/TSQ-47; additional tools and means to compensate for failure of radar or other navigational aids are provided; controllers become proficient at an earlier time in the training experience cycle; and the decision making task load on the entire AN/TSW-5 control team is reduced. With computer path-prediction and scheduling provided, the communication channel load factor is less than 70% at all controller positions when handling 50 approaches per hr. (Author) (U)

AD- 283 689
COURTNEY AND CO PHILADELPHIA PA

THE CONTROLLER IN POSITIVE AND TRADITIONAL CONTROL (U)

SEP 61 1V DAVIS,C. GLENN;WALLACE,WALLACE H.;
REPT. NO. 58
CONTRACT: FAA BDR301

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AIR TRAFFIC CONTROLLERS, AIRPORT RADAR SYSTEMS, DISPLAY SYSTEMS, EFFECTIVENESS, HIGH ALTITUDE, INSTRUMENT FLIGHT, JOB ANALYSIS, RADIO BEACONS, RADIO EQUIPMENT, RADIO NAVIGATION, STATISTICAL ANALYSIS (U)

The activities of the controllers from three centers were compared to determine the effects of Positive Control on air traffic controllers. Every observable activity of each of the controllers was recorded during periods of high activity. Each sector was analyzed by combining recordings from direct observation with analyses of tape recordings of all communications. The findings are summarized as follows: (1) Although the number of aircraft being controlled was higher and each of the aircraft received more service than under Traditional Control, Positive Control did not significantly increase the controllers' communication workload. (2) The amount of coordination required by Conventional Positive Control was somewhat higher. (3) The beacon hand-offs were considerably more efficient than the radar hand-offs in terms of the amount of time they required. (4) The comparison of two Positive Control systems data indicates that the tracker position may not be essential. An analysis of activities of the tracker indicates that many of these manual functions may be adequately performed by mechanical tracking devices that are presently available as ''off-the-shelf'' items. (Author) (U)

AD- 283 060
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

ACTIVITY REPORT (U)

JUL 62 1V
REPT. NO. TDR62 25
MONITOR: ESD TDR62 25

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *GLIDE PATH SYSTEMS, *MARKER LIGHTS, *RADAR NAVIGATION, AIRPORT RADAR SYSTEMS, AVIATION SAFETY, DATA PROCESSING, DISPLAY SYSTEMS, RADAR EQUIPMENT (U)

Contents: APPROACH AND LANDING SYSTEMS: AN/GSN-5A, BLEU landing system, REGAL, FLARESCAN, and AN/APN-114. AIRPORT LIGHTING SYSTEMS: Sylvania simplified approach lights, centerline taxiway lighting, runway crossbars and distance-to-go signs, shield for approach light sequence flasher, semi-flush mounted runway lights, comparison of U. S. Red-White VGSI and Australian TEE-VGSI, and heliport surface lights. DATA ACQUISITION AND PROCESSING: A /GSN-11 and data processing central. NAVIGATION: Doppler VOR/TACAN colocation tests, radio doppler direction finding, minimum air navigation, and pictorial displays and course line computers. RESEARCH: ATC concepts for supersonic and hypersonic vehicles, weather hazards detection and circumnavigation, advanced communications techniques for LODISNAV, pilot warning information requirements, Hawaiian Islands ATC simulation study, and water squeezertype aircraft arresting system. (Author) (U)

AD- 282 931
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

TEST AND EVALUATION OF THE BI-DIRECTIONAL COMPUTER UPDATING EQUIPMENT (CUE) (U)

FEB 62 1V MCAFEE,E.L.;JOLITZ,G.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COMPUTERS (U)

Studies were made to determine if the computer updating equipment met specifications, to investigate the operational advantages and disadvantages of the equipment, and to measure the loading effect it would have on an air traffic control automation system. The computer updating equipment tested consisted of a keyboard entry device, a visual display unit and associated electronic components necessary to interconnect with the UFC-1 automation system. The components met specifications in most particulars. Results of the operational evaluation proved the concept of computer updating to be feasible, and that the equipment could be operationally utilized with no additional workload on the part of the controller. The loading study indicated that the computer updating function would require approximately as much processing time as was required to perform flight plan processing and strip printing. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 281 738
HRB-SINGER INC STATE COLLEGE PA

DESIGN RECOMMENDATIONS FOR A MOBILE RUNWAY LIGHTING SYSTEM. (U)

JUL 62 22P [illegible],Robert B. ;Kresse, Frederick H. ;
REPT. NO. HRB-353-R-1
CONTRACT: AF19 628 439
MONITOR: ESD TDR62 188

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *LIGHTING EQUIPMENT, *MARKER LIGHTS, AIR FORCE OPERATIONS, AIRBORNE, DESIGN, JET AIRCRAFT (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT (M)

This report establishes design recommendations for a mobile runway lighting system to handle jet aircraft in weather conditions down to 1/2 mile visibility and 200 ft ceiling. Intended for use in the AN/TSQ-47 Mobile Air Traffic Control Communication System (Augmented 'Four-Wheels'), the lighting system had to be within the state-of-the-art, and comply fully with the AN/TSQ-47 specifications for power, air transportability, limited field maintenance, adaptability to environmental extremes, and rapid installation and take-down. (Author) (M)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 276 715
HAZELTINE TECHNICAL DEVELOPMENT CENTER INC INDIANAPOLIS IND

AN INVESTIGATION OF ANALOGUE AIDS FOR MOBILE RAPCON CONTROLLERS (U)

JAN 62 1V VICKERS,TIREY K.;SEASOR,DARRELL E.;
REPT. NO. 62 152
CONTRACT: AF19 604 8452
MONITOR: AFCRL 62 152

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *ANALOG COMPUTERS, *GROUND-CONTROLLED APPROACH RADAR, *LANDING, AIR CONTROL CENTERS, AIR TRAFFIC, APPROACH INDICATORS, COMPUTERS, DATA PROCESSING, MOBILE, SCHEDULING (U)

A design study was directed toward the introduction of simple, lightweight analogue devices to improve the operational performance of Mobile USAF Radar Approach Control (RAPCON) facilities. Special emphasis was placed upon the need for scheduling spacing, and guiding high performance aircraft returning from high priority missions. Operational requirements are outlined and designs are presented for an Approach Scheduling Control (ASCON) Computer, an Approach Spacing Computer, and a Tangential Approach Computer. The study was supplemented by the construction of a breadboard model of the Approach Spacing Computer, for testing and evaluation. (Author) (U)

AD- 276 488
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

DYNAMIC SIMULATION STUDY AND EVALUATION OF A PROPOSED AIR TRAFFIC PROCEDURAL PLAN AND CONTROL EQUIPMENT CONFIGURATION FOR THE WASHINGTON, D.C. AREA (U)

MAR 62 1V BOTTOMLEY,D.;HANSEN,R.E.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR CONTROL CENTERS, *AIR TRAFFIC CONTROL SYSTEMS, AIRPLANE LANDINGS, AIRPORT CONTROL TOWERS, AIRPORT RADAR SYSTEMS, DESIGN, GROUND-CONTROLLED APPROACH RADAR, OPERATIONS RESEARCH, SCHEDULING, SIMULATION, TAKEOFF (U)

A simulation and evaluation study was made of a proposed procedural plan for the operation and control of instrument flight rule (IFR) air traffic in the Washington D. C. area. An optimum procedural plan was developed by simulation and modification of the proposed plan; this plan was then tested with three different IFR controlroom equipment configurations. The first of the equipment tests utilized a terminal area IFR room configuration proposed for location in Hangar 6 at Washington National Airport in the space presently occupied by the Air Route Traffic Control Center. Two other configurations were tested which integrated terminal control with en route control, one an ''In-Line'' and the other a ''Butterfly'' equipment arrangement. The two integrated configurations were proposed for installation in the new Center building at Leesburg, Va. The modified procedural plan functioned properly with the traffic density simulated under all three equipment configurations, with approximately the same number of aircraft movements. Over-all coordination was easier and controller workload was less under the ''Butterfly'' configuration. Separate tests were made of Andrews Air Force Base IFR and VFR traffic with increased density. (Author) (U)

AD- 276 372
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

A LABORATORY MODEL FOR SYSTEMS RESEARCH: A TERMINAL AIR TRAFFIC CONTROL SYSTEM (U)

SEP 61 1V ALEXANDER L.T.,COOPERBAND,A.S.; REPT. NO. TM639

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, AIR CONTROL CENTERS, COMPUTERS, DESIGN, HUMAN FACTORS ENGINEERING, OPERATIONS RESEARCH, SIMULATION, TEST METHODS (U)

The Terminal Air Traffic Control System (TATCS) was designed as a laboratory vehicle for studying future requirements of air control centers and the relationship of men and machines and their interactions. (Author) (U)

AD- 275 982
COOK RESEARCH LABS MORTON GROVE ILL

ADVANCED HIGH DENSITY LANDING SYSTEM STUDY (U)

JAN 62 1V GREGORY,E.C.;
CONTRACT: DA36 039SC87260

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AIRPLANE LANDINGS, *FLIGHT PATHS, *INSTRUMENT LANDINGS, *LANDING AIDS, AIRPLANES, ALL WEATHER AVIATION, ARMY AIRCRAFT, ARMY OPERATIONS, CONTROL, DATA PROCESSING, DISPLAY SYSTEMS, GUIDANCE, HELICOPTERS, MILITARY REQUIREMENTS, NAVIGATION, SHORT TAKEOFF AIRCRAFT, VERTICAL TAKEOFF AIRCRAFT (U)

A study was made of an advanced high d nsity landing sys em. The ideal army aircraft landing sy tem ould be manually controlled and not basically automatic. Many years of computer development will be necessary before an automatic flight control system can equal the human operator's reliabili y in adaptive, predictive, and non-line r control ability. Data display requirements for a pilot controlled landing system are discussed, and it is believed that essentially such displays must be provided for syst m monitoring purposes before an automatic landing syste will be operationally acceptable. adv nced high density landing system guidance requir c n b st b fulfilled by two or more scanning beams and one DME NAVAID. A kinematic approach to a solution of the automatic landing syst m problem is appende (Author) (U)

AD- 275 888
FEDERAL AVIATION AGENCY WASHINGTON D C

INTERNATIONAL AVIATION RESEARCH AND DEVELOPMENT SYMPOSIUM APRIL 10-14, 1961, ATLANTIC CITY, N.J. REPORT OF THE PROCEEDINGS (U)

DEC 61 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *SYMPOSIA, AUTOMATIC, AVIATION SAFETY, DATA PROCESSING, DESIGN, DISPLAY SYSTEMS, DOPPLER NAVIGATION, DOPPLER RADAR, HYPERBOLIC NAVIGATION, RADAR, RADAR BEACONS, RADAR TRACKING, COMMUNICATION AND RADIO SYSTEMS, SIMULATION (U)
IDENTIFIERS: SATIN (M)

FEDERAL AVIATION AGENCY SYMPOSIUM ON AIR TRAFFIC CONTROL SYSTEMS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 275 825
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF

AN ESTIMATE OF THE 1970-75 ENVIRONMENT FOR AIR-TRAFFIC CONTROL (U)

SEP 61 1V FARR,L.;SCHMITZ,H.;
REPT. NO. TM599 000 01

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *OPERATIONS RESEARCH, AIR FORCE OPERATIONS, AIR TRAFFIC, AIRPORT RADAR SYSTEMS, AIRPORTS, AUTOMATIC PILOTS, COMMERCIAL PLANES, COMMUNICATION SYSTEMS, DENSITY, GROUND SUPPORT EQUIPMENT, MILITARY REQUIREMENTS, NAVIGATION, RADAR, RADAR BEACONS (U)

Research began on terminal air traffic control. The results provide a basis for the initial design of the Terminal Air Traffic Control system to be simulated in the Systems Simulation Research Laboratory. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M08

AD- 275 707
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

DYNAMIC SIMULATION STUDIES OF PICTORIAL NAVIGATION DISPLAYS AS AIDS TO AIR TRAFFIC CONTROL IN A HIGH-DENSITY TERMINAL AREA AND A MEDIUM-DENSITY TERMINAL AREA (U)

NOV 61 1V FAISON,WALTER E.;SLUKA,ANDREW L.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COCKPITS, *DISPLAY SYSTEMS, AIR TRAFFIC CONTROLLERS, AIRCRAFT EQUIPMENT, ELECTRONIC EQUIPMENT, FLIGHT INSTRUMENTS, HUMAN FACTORS ENGINEERING, SIMULATION, TESTS (U)

An evaluation to determine the effect of cockpit pictorial displays on system operation in representative high-density and medium-density terminal areas is described. The representative areas of study were New York and Kansas City. Simulation of present-day control methods and procedures provided a basis for comparison aginst tests in which varying percentages of the traffic were equipped with pictorial display capabilities. A description of the various applications of pictorial displays, along with an evaluation of the related values, procedures, route structures and techniques, is included. The nature and distribution of air movements include arrivals, departures, overflights, and all types of aircraft currently using each airfield. Major improvements were in the areas of reduced controller workload and an increased ability to manipulate traffic. The pictorial display routes, procedures, and techniques can be systematically integrated with the existing system. (Author) (U)

AD- 275 450
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

HUMAN ENGINEERING ANALYSIS OF THE AUGMENTED FOUR WHEELS SYSTEM (U)

MAR 62 1V GRANT,GEORGE;KING,ROBERT B.;GATES, STEPHEN H.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *HUMAN FACTORS ENGINEERING, *SHELTERS, AIR FORCE COMMUNICATIONS, COMMUNICATION SYSTEMS, GROUND-CONTROLLED APPROACH RADAR, HAZARDS, HUMIDITY, ILLUMINATION, COMMUNICATION AND RADIO SYSTEMS, MOBILE, NOISE, OPERATION, RADAR STATIONS, RADIO STATIONS, SAFETY, SEARCH RADAR, STANDARDIZATION, TEMPERATURE (U)
IDENTIFIERS: AIR FORCE COMMUNICATIONS, MILITARY COMMUNICATION, AN/TSQ-47 (M)

HUMAN ENGINEERING ANALYSIS OF A MOBILE AIR TRAFFIC CONTROL SYSTEM FOR USE IN EMERGENCY OR SPECIAL TACTICAL SITUATIONS, WITH EMPHASIS ON COMMUNICATIONS, INSTRUMENT FLIGHT RULES, TOWER, SURVEILLANCE RADAR, AND PRECISION APPROACH RADAR SHELTERS.

AD- 275 382
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

INFORMATION FLOW ANALYSIS OF A TRANSPORTABLE AIR TRAFFIC CONTROL SYSTEM (U)

FEB 62 1V POGUST,F.B.;FREEBERG,N.E.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS, *MOBILE, *RADAR EQUIPMENT, AIR FORCE COMMUNICATIONS, DISPLAY SYSTEMS, GROUND SUPPORT EQUIPMENT, MILITARY REQUIREMENTS, SURFACE TO AIR (U)
IDENTIFIERS: AIR FORCE COMMUNICATIONS (M)

TASK ANALYSIS OF A MOBILE TRAFFIC CONTROL SYSTEM WAS CONDUCTED REGARDING TYPE AND QUANTITY OF INFORMATION FLOW, CAPABILITIES OF CONTROLLERS AND EQUIPMENT.

AD- 273 742
AIRBORNE INSTRUMENTS LAB DEER PARK N Y

ANALYSIS OF PERFORMANCE OF ATC RADAR BEACON SYSTEM IN SATIN (U)

MAR 60 1V ASHLEY,A.;COLE,L.G.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *CIVIL AVIATION, *DATA PROCESSING, *RADAR BEACONS, *RADAR NAVIGATION, *RADAR TRACKING, AERIAL TARGETS, ANALYSIS, AUTOMATIC, CODING, DISPLAY SYSTEMS, EFFECTIVENESS, FLIGHT PATHS, IDENTIFICATION SYSTEMS, POSITION FINDING, RADAR SIGNALS, RELIABILITY (U)
IDENTIFIERS: SATIN, SAGE, AN/FSQ-7, AN/FST-2 (U)

The Federal Aviation Agency is investigating the use of the SAGE air defense system for enroute air-traffic control. The program of SAGEAIR TRAFFIC INTEGRATION AND THE EXPERIMENTAL SYSTEM USED IN THIS PROGRAM IS KNOWN AS SATIN. A beacon code-usage plan that provides for display filtering in both manual and automatic systems is developed. The performance of the AN/FST-2 as a beacon data processor is analyzed. The performance includes target detection, release, center marking, and code readout. Deficiencies in code-readout performance are indicated and possible remedies are suggested. The code-processing performance of the AN/FSQ-7 is analyzed and determined to be adequate when the AN/FST-2 deficiencies are corrected. (Author) (U)

AD- 273 545
TASKER INSTRUMENTS CORP VAN NUYS CALIF

DEVELOPMENT OF EQUIPMENT FOR TRANSITION/TERMINAL AREA SUBSYSTEM OF THE AIR TRAFFIC CONTROL DATA PROCESSING CENTRAL (U)

JAN 62 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR CONTROL CENTERS, *AIR TRAFFIC CONTROL SYSTEMS, *ANALOG COMPUTERS, *DATA PROCESSING, AIRPORT RADAR SYSTEMS, AUTOMATIC, CIRCUITS, COMPUTERS, CONTROL SYSTEMS, DESIGN, DISPLAY SYSTEMS, ELECTRONIC EQUIPMENT, INSTRUMENTATION, PROGRAMMING (COMPUTERS), RADAR EQUIPMENT, RADAR SIGNALS, RADAR TRACKING, RADIO BEACONS, VIDEO NETWORKS, VIDEO SIGNALS (U)

A video tracking system is described which receives primarly radar and beacon data, data inputs from the transition data processing group, and command inputs from the controller. Radar and beacon data are processed by the video conditioner. Data inputs are stored by the video track programmer and command inputs are stored either by the video track programmer or in associated circuitry. These types of data, along with information which is internally generated by the video tracking systems are used to track aircraft automatically and provide surveillance and control information for the control of air traffic within the transition terminal area. Inputs from the transition data processing group are also utilized in presenting a tabular display of the identity and time to fly of the next 5 aircraft to land, by means of electromechanical alpha-numeric indicators which are mounted at the local controller's console and at the precision approach radar console. (Author) (U)

AD- 271 737
ITT GILFILLAN INC LOS ANGELES CALIF

INVESTIGATION OF DIGITAL/HYBRID ATC AIDS FOR MOBILE RAPCON CONTROLLERS (U)

NOV 61 1V FRITCH,VINCENT J.;JUDD,JAMES R.;
CONTRACT: AF19 604 8363
MONITOR: AFCRL 965

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *PLAN POSITION INDICATORS, *COMMUNICATION AND RADIO SYSTEMS, AIR CONTROL CENTERS, CHANNEL SELECTORS, DESIGN, DIGITAL SYSTEMS, DIRECTION FINDING, EFFECTIVENESS, HUMAN FACTORS ENGINEERING, IDENTIFICATION SYSTEMS, MOBILE, RADAR TARGETS, RADAR TRACKING, TARGET RECOGNITION, TESTS (U)
IDENTIFIERS: TACAN (U)

Investigations were made of digital/hybrid devices which would assist air traffic controllers of USAF mobile ATC detachments. The scope of the investigations encompassed 2 complementary programs: (1) development of simple, effective techniques for improving the quality of service provided by a mobile RAPCON; and (2) evaluation of the special requirements of a mobile air traffic control facility. Phase I effort was directed primarily toward: (1) development of techniques or equipments to replace the grease pencils and other manual procedures employed at existing RAPCON's; (2) evaluation of various means to augment information available to the PPI display; and (3) evaluation of RAPCON communications channel selection and control equipments. Phase II was initiated with a comprehensive study of anticipated air traffic environments through the period ending in 1970. (Author) (U)

AD- 268 954
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROBLEMS IN AIR TRAFFIC MANAGEMENT: I. LONGITUDINAL PREDICTION OF EFFECTIVENESS OF AIR TRAFFIC CONTROLLERS (U)

DEC 61 1V TRITES,DAVID K.;
REPT. NO. 61 1

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROLLERS, ACHIEVEMENT TESTS, APTITUDE TESTS, EFFECTIVENESS, MATHEMATICAL PREDICTION, PERSONALITY TESTS, STATISTICAL ANALYSIS (U)

Current (1961) job performance evaluations and medical history data were obtained for 149 of 197 men trained in air traffic control work in 1956. Evaluations of psychological test and biographical data collected at the time they went through training indicate that: (1) Psychological tests can make a useful contribution to screening applicants for air traffic control work; (2) Instructors in the air traffic control school can make exceptionally valid predictions of job performance evaluations some years later; (3) Older trainees tended to receive poorer job performance ratings some years later than did their younger classmates; (4) Medical history information of the kind collected in this study is not predictable by the psychological tests which were used. (Author) (U)

AD- 265 645
FEDERAL AVIATION AGENCY WASHINGTON D C

CHICAGO TRANSITION TERMINAL AREA AIR TRAFFIC SAMPLE IN SUPPORT OF THE CHICAGO POSITIVE CONTROL STUDY (U)

JUN 61 1V STEECE,PHILIP J.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC, *AIR TRAFFIC CONTROL SYSTEMS, ANALYSIS (U)

This report contains an air traffic sample and analyses of the Chicago Transition Terminal Area. It was prepared in support of the Systems Engineering Division's task assignment to study the feasibility of low altitude positive control within a high density terminal area. One hundred and seventy-three airfields are located within a 100 nautical mile radius of the center point of the area under study. These airfields are estimated to contain about 4,200 general aviation and military active based aircraft. In addition, 866 daily scheduled air carrier flights through the area are expected. Nine hundred and fifty-two flights are estimated to occur during the busy two-hour sample period within the Chicago Transition Terminal Area. 68% of these flights are general aviation, 27% are air carrier, and 5% military. Two hundred and sixty-six flights are predicted to occur at the peak instant. Fifty-two percent of the total flights within the area under study are flown at altitudes below 5,000 feet, and 87% at altitudes below 10,000 ft. During the busy 2-hr period 25% are expected to be on IFR flight plans. (Author) (U)

AD- 265 458
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

BEACON VIDEO DEFRUITING EQUIPMENT STORAGE TUBE TYPE 2.3NS9 (U)

MAR 61 1V BARKALOW,R.R.;PENGE,A.J.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *RADAR EQUIPMENT, *RADAR INTERFERENCE, *STORAGE TUBES, DISPLAY SYSTEMS, EFFECTIVENESS, ELECTRON TUBES, IDENTIFICATION, RADAR BEACONS, REDUCTION, SIGNAL-TO-NOISE RATIC, TESTS, VIDEO NETWORKS, VIDEO SIGNALS (U)

Tests were made to determine the technical and operational merits of the storage tube defruiting equipment, 2.3NS9, designed for the filtering out of asynchronous replies of an air traffic control radar beacon system operating in an area of high electromagnetic radiation density emanating from normal beacon interrogators and radar environments. The equipment's ability to reject nonsynchronous reply signals in a ratio comparable to presently employed defruiting techniques was successfully demonstrated. The equipment's variable pulse repetition frequency makes it compatible with all radars presently employed in the air traffic control radar environment. (Author) (U)

AD- 264 356
COOK RESEARCH LABS MORTON GROVE ILL

ADVANCED HIGH DENSITY LANDING SYSTEM STUDY (U)

JUL 61 1V GREGORY,E.C.;
CONTRACT: DA36 039SC87260

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *AIRPLANE LANDINGS, *ALL WEATHER AVIATION, *ARMY AIRCRAFT, *FLIGHT PATHS, *HELICOPTERS, *INSTRUMENT LANDINGS, ARMY OPERATIONS, AUTOMATIC PILOTS, GUIDANCE (U)

Redetermining and selectable path all-weather landing systems are described. The geo-referenced, aircraft touchdown approach angle as a function of ground speed is reported. Aircraft landing navigation by NAVAID line of position flying is discussed. Continuation of the kinematic approach is appended. (Author) (U)

AD- 264 252
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

AIR-GROUND-AIR COMMUNICATIONS AUGMENTED 4-WHEELS (U)

JUL 61 1V WOLLAN,ROLF W.;
CONTRACT: AF19 604 8019
MONITOR: AFCRL 540

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION AND RADIO SYSTEMS, *VOICE COMMUNICATIONS, AIR CONTROL CENTERS, AIR FORCE COMMUNICATIONS, ANTENNAS, DESIGN, HIGH FREQUENCY, INSTALLATION, MINIATURE ELECTRONIC EQUIPMENT, MOBILE, POWER SUPPLIES, RADIO EQUIPMENT, RADIO INTERFERENCE, REDUCTION, TEST EQUIPMENT, TRANSMITTER RECEIVERS, ULTRAHIGH FREQUENCY, VERY HIGH FREQUENCY (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT, AIR FORCE COMMUNICATIONS (U)

The augmented 4-wheels program was initiated to update the capability of the 4-wheels airtransportable, air traffic control system. For the VHF and UHF air-ground air communications part of this system, this meant primarily the addition of new up-to-date channelized radio equipment. Improvements in the state of the art and miniaturization permitted the selection of much smaller and lighter components. At the same time, a study of the interference problems predicted the degree of pre-selection and antenna isolation parameters required for the operation of the multi-channel system from a single shelter. The resultant system includes 7 20-watt UHF transceivers connected through 2 UHF tandem cavity antenna couplers to UHF antennas, 4 25-watt VHF transmitter/receivers connected through 2 VHF antenna couplers to 1 VHF antenna couplers to 1 VHF antenna, and 1 1-kilowatt HF singlesideband transmitter/receiver connected through 1 antenna coupler to 1 HF antenna. Single mast construction using collinear stacking of UHF and VHF antennas provides the antenna configuration for the system. (Author) (U)

AD- 263 547
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

POINT-TO-POINT COMMUNICATIONS AUGMENTED 4-WHEELS (U)

MAY 61 1V GIACOLETTO,J.P.;
CONTRACT: AF19 604 8019
MONITOR: AFCRL 510

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION AND RADIO SYSTEMS, *VOICE COMMUNICATIONS, ANTENNAS, CIRCUITS, DESIGN, HIGH FREQUENCY, PANEL BOARDS (ELECTRICITY), POWER SUPPLIES, RADIO EQUIPMENT, SIDEBANDS, TELEPHONE SYSTEMS, TELETYPE SYSTEMS (U)
IDENTIFIERS: AUGMENTED FOUR WHEELS PROJECT (U)

The augmented 4-wheels program was initiated to update the capability of the 4-wheels airtransportable, air traffic control system. As regards the HF point-to-point communications part of this system, this meant primarily the addition of single side-band techniques. At the same time, state-of-the-art improvements permitted the selection of much smaller and lighter components with the result that the transmitting and receiving functions are combined in one shelter. Since each radio equipment has four channel capability, as necessary to conform with ambient Aircom practices, two directional antennas are provided to enhance propagation reliability. Ranges up to 2500 miles are expected provided appropriate selection is made of operating frequency and circuit loading. Automatic quick tuning is provided in the proposed system with r-f channels selectable on a 0.1 kc basis. Ten telephone and ten teletypewriter circuits connect to the shelter. The proposed shelter is 84 x 84 x 154 inches in outside dimensions. The system includes primary power units and air conditioning units. Total space requirement for transport is 820 cubic feet. The system weight is estimated as less than 14,000 pounds. (Author) (U)

AD- 262 012
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

EXPERIMENTAL AIR TRAFFIC CONTROL RADAR BEACON INTERROGATOR RECEIVING EQUIPMENT, FAA+BRD TYPE 40212(X-1) (U)

SEP 60 1V BARKALOW,R.R.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *RADAR BEACONS, ACCEPTABILITY, ANTENNA LOBES, CODING, FLIGHT TESTING, IDENTIFICATION SYSTEMS, PLAN POSITION INDICATORS, POSITION FINDING, RADAR RECEIVERS, REDUCTION, RELIABILITY, TESTS (U)

Engineering acceptance tests of the experimental interrogator, type 40212(X-1) were conducted to determine the technical adequacies of the equipment to meet Federal Aviation Agency specifications of increased angular resolution and sidelobe suppression techniques. An ANDB 2.3NS1B beacon interrogator was modified to provide increased angular resolution of responding aircraft on the plan position indicator display of the Air Traffic Control Radar Beacon System. Flight tests conducted indicated that the feasibility of the center mark technique for increased angular accuracy could be useful in the beacon environment. (Author) (U)

AD- 262 010
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

SIMULATION TESTS OF DATA PROCESSING CENTRAL (DPC) MISSED-APPROACH AND TERMINAL AREA (U)

SEP 60 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC, *AIR TRAFFIC CONTROL SYSTEMS, *DATA PROCESSING, AIRCRAFT, COMPUTERS, DISPLAY SYSTEMS, LANDING, SIMULATION, TEST METHODS, TESTS (U)

Test results indicated that the missed-approach display described in AMB-58-2 could be eliminated and its function absorbed by the missed-approach route display which indicates the status of unassigned arrival slots pictorially. However, additional information will be required by the controller if arrival slots are not available and delay at a missed-approach holding fix is anticipated. From an operational standpoint, it wouldAPPEAR MORE COMPATIBLE WITH PRESENT PROCEDURES IF THE MISSED-APPROACH DISPLAY WAS RELOCATED FROM THE ARRIVAL TO THE DEPARTURE PLAN POSITION INDICATOR RADAR SCOPE. Controller opinion indicated that a single controller could not handle both departure and missed-approach aircraft with the volume of traffic simulated. During the initial course of the study, it was found that, if fixed time separation was a requirement (2 minutes was used to provide a minimum of 3 miles' separation), it would be better to have the point at which the aircraft were scheduled to pass at equal intervals to be on the localizer course rather than at touchdown. For the traffic sample used in simulation, the schedule point was 3 miles from touchdown or approximately at the Idlewild outer marker. (Author) (U)

AD- 260 860
AIRBORNE INSTRUMENTS LAB INC MINEOLA N Y

INSTRUCTION MANUAL FOR BEACON VIDEO DEFRUITING EQUIPMENT FAA/BRD TYPE 2.3NS9 (U)

FEB 61 1V
REPT. NO. 7407 1
CONTRACT: FAA BDR111

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *IDENTIFICATION SYSTEMS, *RADAR BEACONS, AIRCRAFT, CIRCUITS, CONTAINERS, DESIGN, ELECTRONIC EQUIPMENT, IDENTIFICATION, INSTALLATION, INSTRUCTON MANUALS, INTERFERENCE, MAINTENANCE, POWER SUPPLIES, RADAR EQUIPMENT, RADAR INTERFERENCE, REDUCTION, RELIABILITY, STORAGE TUBES, VIDEO SIGNALS (U)

The design and development of the FAA Type 2.3NS9 Beacon Video Defruiting Equipment is presented. The purpose of this equipment is to eliminate any non-synchronous beacon replies from the received video signals before they are passed to the decoder. The equipment utilizes three storage tubes to obtain the necessary delay. Defruiting can be performed with jittered PRF systems. A one to one interlace capab lity is included in the design. (A thor) (U)

AD- 260 283
NAVY ELECTRONICS LAB SAN DIEGO CALIF

A VISUAL COMMUNICATION SYSTEM FOR ROUTING STEREOTYPED MESSAGES IN AIR TRAFFIC CONTROL (U)

NOV 60 1V HENRY,F.G.;MERROW,C.M.;
REPT. NO. 1003

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION SYSTEMS, INSTRUMENTATION, TEST EQUIPMENT, VISUAL SIGNALS (U)

ON THE BASIS OF A STUDY OF VOICE MESSAGES INVOLVED IN INTERNAL COMMUNICATIONS IN Navy radar air traffic control centers, a visual signaling system was developed to replace and/or supplement voice transmissions. Operation of the prototype system at NAS Miramar showed that it increased the flow of instrument traffic and reduced the noise level in the center. The visual communication system showed sufficient promise to warrant design of similar instrumentation to ADAPT IT TO THE VARYING REQUIREMENTS OF OTHER AIR TRAFFIC CONTROL FACILITIES. (Author) (U)

AD- 259 134
STEWART WARNER CORP CHICAGO ILL

ANALYSIS AND COMPARISON OF THE SETRIN AND STEWART-WARNER ATC RADAR BEACON INTERROGATION PATH SIDE LOBE SUPPRESSION/REFLECTION SUPPRESSION SYSTEMS (U)

JAN 60 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *ANTENNA RADIATION PATTERNS, *IDENTIFICATION SYSTEMS, *RADAR ANTENNAS, *RADAR BEACONS, *RADAR EQUIPMENT, *RADAR PULSES, AIRBORNE, ANTENNA LOBES, ANTENNAS, CIRCUITS, CODING, DESIGN, EFFECTIVENESS, ERRORS, FLIGHT TESTING, PLAN POSITION INDICATORS, REDUCTION, REFLECTION (U)
IDENTIFIERS: AN/APX-6 (U)

Evaluations and comparisons are made of the Stewart-Warner and Setrin side lobe suppression/reflection suppression systems, both of which are 3 pulse systems. The comparative effectiveness of each in eliminating side lobe and reflection interrogations and the possible problem areas of each are discussed. Antenna configurations to accomplish the desired suppressions are described. Additional system improvements are suggested. It is shown that it is possible for a 3 pulse system to accomplish complete side lobe and reflection interrogation suppression. The extent of side lobe suppression/reflection suppression desired will determine the system and equipment requirements. (Author) (U)

AD- 257 744
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J

VIDEO TRACKING EXPERIMENTATION (U)

AUG 60 1V STINSON,LEO F.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *RADAR TRACKING, AIR CONTROL CENTERS, ANALOG SYSTEMS, DATA PROCESSING, INSTRUMENTATION, PLAN POSITION INDICATORS, RADAR SCANNING, RADAR TARGETS, TESTS, TRACKING, VIDEO SIGNALS (U)

A test program was conducted on a breadboard Cartesian coordinate radar track-while-scan system to establish methods and means for measuring the pertinent characteristics of video tracking equipment. The breadboard tracking equipment from the U. S. Air Force Radar Approach Control II program was installed at the NationalAviation Facilities Experimental Center. Various methods applicable to future technical evaluation programs on similar tracking systems were investigated. Tests were conducted to determine tracking accuracy as a function of target velocity and radial acceleration, the effects of tracking gate size on tracking performance, tracking limitations imposed by the presence of random noise, and a variety of other tracking functions. (Author) (U)

AD- 257 102
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

RADIO (SELECTED ARTICLES) (U)

NOV 60 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *AIR TRAFFIC CONTROL SYSTEMS, *RADAR NAVIGATION, *RADIO NAVIGATION, FUEL CELLS, GLIDE PATH SYSTEMS, GROUND-CONTROLLED APPROACH RADAR, GROUND POSITION INDICATORS, HYPERBOLIC NAVIGATION, INSTRUMENT FLIGHT, INSTRUMENT LANDINGS, NAVIGATION, POWER SUPPLIES, RADAR EQUIPMENT, RADAR HOMING, RADIO EQUIPMENT, RADIO HOMING, RADIO RECEIVERS, SEXTANTS (U)

Contents: Radio electronics in aircraft navigation Long-range navigation media Panoramic aircraft radar Dead reckoning instruments Radio sextant Nonautonomous navigation media Hyperbolic systems Azimuth-and-range finding system Short-range navigation media Landing of aircraft at the airport Instrument-assisted landing of aircraft Ground-controlled landing Automatized system for control of air traffic and aircraft-landing guidance Radar station for scanning the airport surface Type VDZh-400 ferrocarbonic cells (air depolarization, iron plate, capacity 400 ampere/hour) Fundamental characteristics of the VDZh-400 cells (U)

CORPORATE AUTHOR - MONITORING AGENCY

*ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT NEUILLY-SUR-SEINE (FRANCE)

* * *

AGARD-CP-240
Guidance and Control Design Considerations for Low-Altitude and Terminal-Area Flight.
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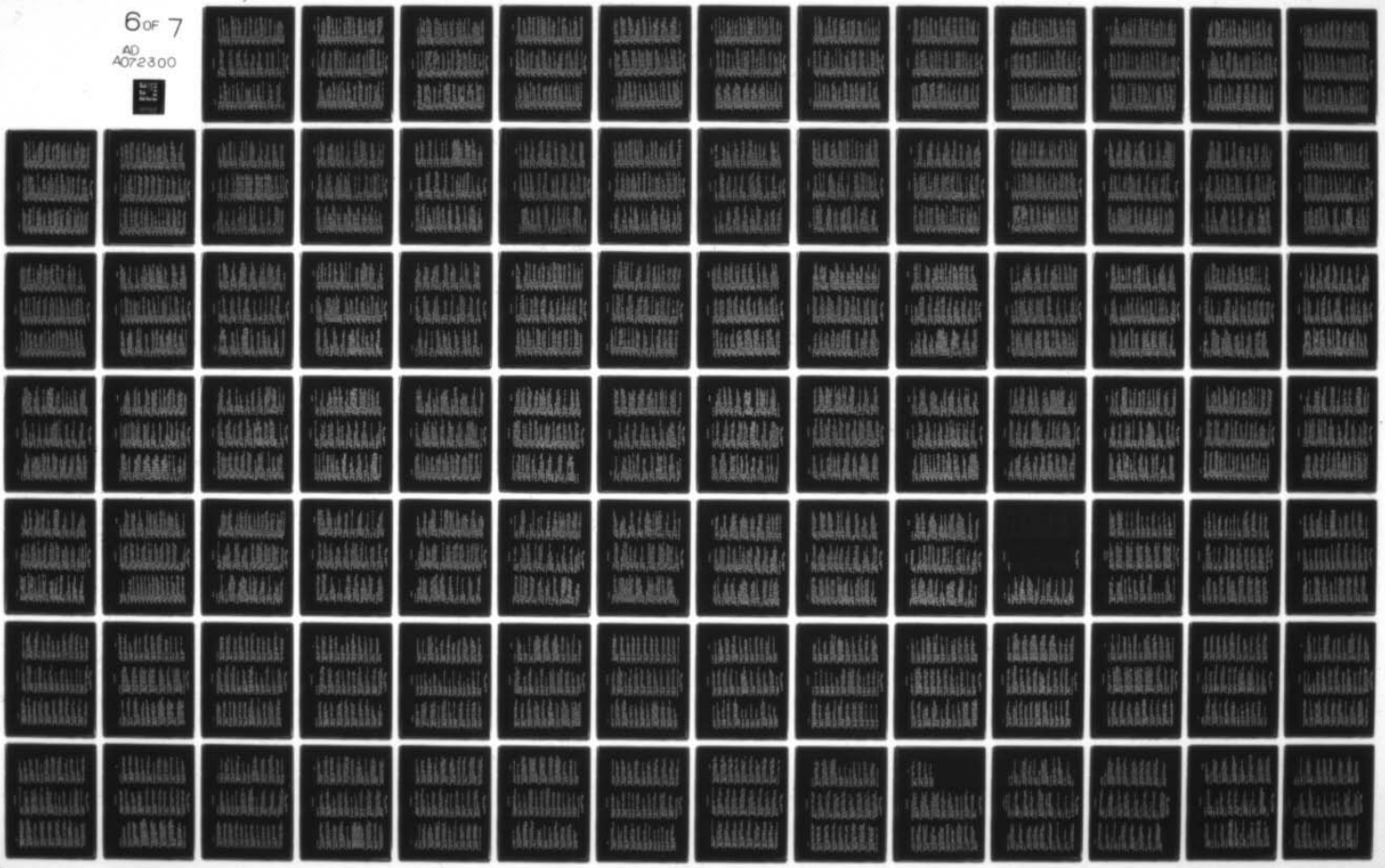
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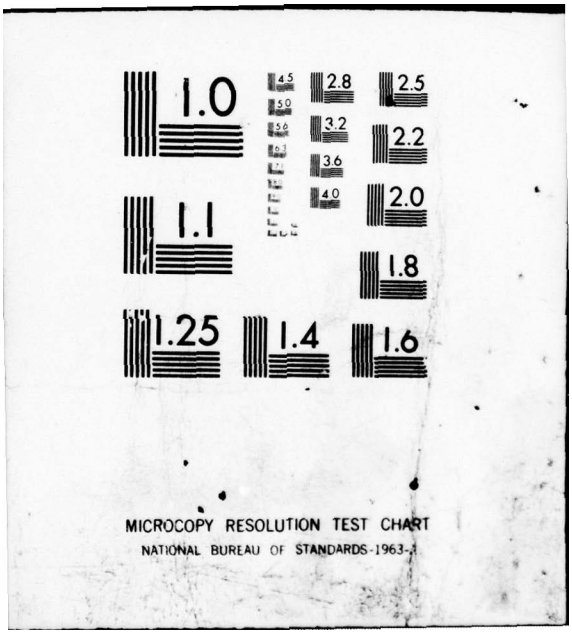
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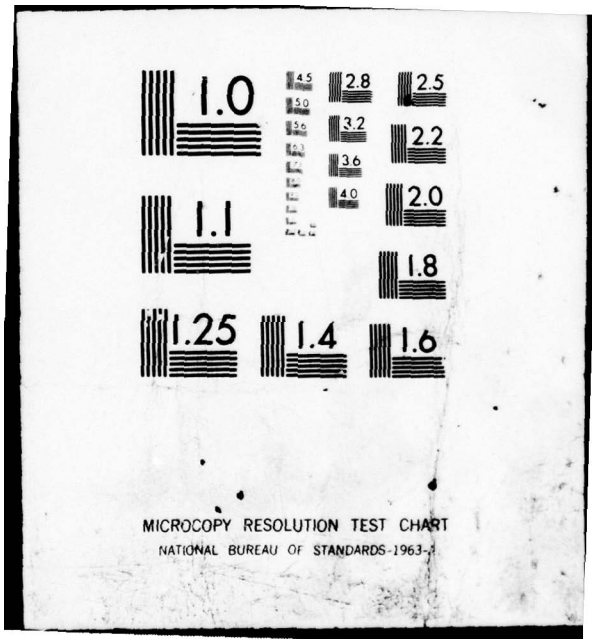
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